A BIBLIOGRAPHY

of

STATISTICAL QUALITY CONTROL

By

GRANT I. BUTTERBAUGH

PUBLISHED FOR THE BUREAU OF BUSINESS RESEARCH
OF THE COLLEGE OF ECONOMICS AND BUSINESS
BY THE UNIVERSITY OF WASHINGTON PRESS
Seattle • 1946

PRINTED IN THE UNITED STATES OF AMERICA

Foreword

Among the many fields of science which have been stimulated by the war is the statistical control of quality in industrial materials and products. Quality control has, of course, been practiced for generations. The use of statistical samples in controlling quality, however, is quite recent. During the war years the demand for this scientific tool was so stimulated that comprehensive training programs were inaugurated throughout the country; war plants installed the system; and a flood of new literature was produced. The demand continues through the reconversion period with every indication of a sustained interest in statistical quality control in the years ahead.

In order to facilitate study and teaching of this subject, Dr. Grant I. Butterbaugh has prepared a carefully annotated bibliography of books and articles on statistical quality control. Unlike ordinary bibliographies, this is no mere listing of subjects labeled "quality control." Indeed many articles so titled were rejected by Dr. Butterbaugh in the preparation of this bibliography because upon examination he found that they dealt with subjects quite unrelated to *statistical* quality control.

The Bureau of Business Research believes that this bibliography fills a real need of those interested in statistical quality control. Statisticians, teachers, students, and businessmen directly responsible for quality control should find it a useful guide to the literature in this field.

NATHANAEL H. ENGLE
Director

Preface

The literature of statistical quality control grew rapidly during the period of World War II because of the impetus given by the government to the use of statistical methods for controlling quality of manufactured products and for more economical sampling of the vast quantities of war goods produced for and purchased by the armed forces. It is estimated that, by the summer of 1945, more than 8000 persons from industrial establishments had received training in statistical quality-control methods in special intensive courses sponsored by the Office of Production Research and Development of the War Production Board. A great many others have received instruction through in-plant courses conducted by statisticians of private companies. It was reported that in one plant alone more than 600 individuals received such training. In England, Canada, and other parts of the British Empire additional thousands have acquired knowledge of statistical quality-control methods, and there is no way of knowing how many other students, workers, and business executives have obtained knowledge in this field either prior to or during the war through personal reading and study. The use of statistical methods and statistical theory in industry and business is not a modern invention, and although statistical quality control, as we know it today, has been a useful tool of production and a protection to the consumer for more than twenty years, the theory upon which it rests has its roots in the dim history of statistical thought.

It is the purpose of this annotated bibliography to bring together a list of as many articles, manuals, government bulletins, and books directly pertaining to this specific subject as time and facilities permit. It is hoped that the manual will be useful not only to beginners in this field of study but also to veteran industrial quality-control engineers and teachers.

Approximately 340 authors are represented in the 712 articles, manuals, and books listed herein. The articles appeared in 137 different periodicals and were published in the United States, England, Canada, and Australia. Unquestionably many other articles and items of interest directly pertaining to this field have been published during the period covered by this bibliography—1924 through 1945; the author would appreciate information about those which have escaped his attention. Many articles containing the words "quality" or "quality control" in their titles do not pertain to what is commonly called statistical quality control, and most of these have been purposely omitted, although a few such articles have been included to illustrate nonstatistical control methods in use.

The author gratefully acknowledges the help and pertinent suggestions generously given by Dr. Walter A. Shewhart and members of his staff; the assistance offered by Dr. W. Edwards Deming of the Bureau of the Budget; the encouragement of Dr. Ralph Hefner, Georgia Institute of Technology; the efficient help of Alice Blackburn, librarian, Bureau of Business Research, University of Washington; and the painstaking assistance of Laura L. Butterbaugh.

G. I. B.

Seattle, Washington
October, 1946

Contents

Explanation

The bibliography proper is divided into three parts—articles in Part I; manuals, monographs, and pamphlets in Part II; and books in Part III. In Part I, the periodicals are listed alphabetically; under each periodical the articles on statistical quality control are arranged consecutively according to date of appearance rather than by author.

For reference to articles by known authors, an author index is provided. The key letter and number will quickly locate an item in the annotated bibliography. The capital letters *A* to *W* refer to the journals in Part I; the lower-case letters *a* and *b* refer respectively to Parts II and III.

A few items are listed without annotation, as the original publication was unavailable for examination. If, however, a competent review or abstract was examined, the annotation is *preceded* by a reference to that source of information. In all other cases, the annotation is based upon first-hand knowledge of the original.

Part I

A1 ACCOUNTING REVIEW (July, 1944) 19:254-260

A view of the statistical method. W. Edwards Deming.

Need of statistical method arises from the fact that all things vary. Necessity for study of abnormal variations. A nontechnical description of the use of Shewhart control charts in the study of variations to help distinguish between assignable and chance causes. The meaning of control limits. Importance of Shewhart control methods in industry, personnel administration, and inventory accounting, as well as in other phases of administration.

A2 ———— (July, 1944) 19:260-266

Statistical uses of accounting data. William B. Rice.

Points out the difference in purposes between accounting and statistics. Discusses several problems in statistical quality control and the use of the control chart as applied to cost analysis. Explains a detailed method for control of certain expenses which will warn of changes in the nature of the universe sampled. Short bibliography.

A3 ADVANCED MANAGEMENT (July-September, 1943) 8:86-91

Management problems of measurement in the inspection function. J. M. Juran.

This article was derived from Chapter 2 of *Management of Inspection and Quality Control.* Explains the elements of the art of inspection; the part played by delegation of authority, fixing of responsibility, division of labor, and types of measurement.

A4 ———— (April-June, 1944) 9:74-78

The use of statistics in management. J. J. Corson.

Discusses the services performed by statistics in management in the formulation of judgment, in the precision and understanding of decisions and instructions communicated by an administration, in aiding in resolving differences of opinion, and in satisfying curiosity.

A5 AERO DIGEST (July, 1943) 43:313-315

Statistical quality control in the aircraft industry. E. A. Pinto.

Explains the meaning of statistical quality control; the general procedure employed in the system; various stages of procedure and their practical application; the meaning of intelligent sampling; size, frequency, and type of sampling; and the use of control charts. Illustration of calculations in connection with use of control charts.

A6 ———— (October, 1943) 43:174-176

Controlling quality in mass production, Grand Rapids Industries, Inc. E. D. Williams.

Outlines the functions and responsibilities of the quality control, inspection, and salvage departments in the fifteen companies combined for aircraft production under the Grand Rapids Industries, Inc. Illustrations.

A7 ———— (September 1, 1944) 46:112-113

Mathematics of quality control. J. R. Crawford.

Explains the relationship of characteristics of a frequency distribution used in the interpretation of a quality-control chart. How the quality-control chart is set up. Charts.

A8 AERO DIGEST (September 15, 1944) 46:110-112

Statistical quality control. V. R. Grom and M. A. Brumbaugh.

Organization of the statistical quality-control set-up at the Buffalo plant of Curtiss-Wright Corp. with a description of the functions of the statistical quality-control, materials review, and corrective-action sections. A comprehensive view of the various uses to which quality-control methods may be put to reduce faults in assembly, speed up production, and establish sampling procedure which will assure the most economical control over the quality of incoming materials. Charts and tables.

A9 ———— (July 1, 1945) 50:107-108

Statistical quality control program. Peter P. Di Paola.

An exposition of the organization and methods used at the Kenmore plant, Curtiss-Wright Corp. Duties of the various sections and divisions explained. Steps leading to installation of the Army Ordnance Sampling Plans covering incoming shipments with greater protection to the buyer against acceptance of defective material, and a degree of protection to the producer against rejection of good material. Description of reports made; use of reports. Savings reported up to 85 per cent in decreasing number of reworks on vendors' products. Use of control chart. Charts and illustrations.

A10 AERONAUTICAL ENGINEERING REVIEW (August, 1943) 2:123-124

Quality control keeps product standards high.

Abstract of article in *Aviation* (June, 1943) 42:160-162 by B. Holland. A review of duties of the quality-control department of the Ryan Aeronautical Co. Forms used are presented in original article.

A11 ———— (October, 1943) 2:117

Quality control.

Abstract of article in *Aircraft Production* (August, 1943) 5:359-363 by K. Hayward. Explains methods adopted by Bristol Aeroplane Co. in the application of statistical quality control to small-quantity output in the aircraft industry.

A12 ———— (February, 1944) 3:120

Stabilized quality control.

Abstract of article in *Aircraft Production* (December, 1943) 5:579-584 by H. Howell. Explains a method calculated to economize time, reduce records necessary, and speed decisions in quality control.

A13 ———— (December, 1944) 3:83

Planned inspection improves quality control. H. Chase.

Abstract of article in *Wings* (November, 1944) 3:1276-1278 by H. Chase. How General Electric Co. plant at Fort Edwards, N. Y., uses planned inspection. First piece check, required before machine operators can proceed, is helpful. Some special fixtures facilitate measurements. Selective assembly aids in holding certain close limits.

A14 ———— (February, 1945) 4:98-99

Records keep everybody quality conscious.

Abstract of article in *Wings* (December, 1944) 3:1313-1318 by H. A. Bartholomaei describing the methods used in the quality-control system of Bendix Radio Division of Bendix Aviation Corporatoin. Twelve illustrations.

A15 AEROPLANE (July 2, 1943) 65:12-13

An inspection revolution by "Bristol's."

A short article setting forth advantages of statistical quality control as experienced by the Bristol Aeroplane Co. Three quality control charts are presented with explanation thereof. Charts and illustration. See *Metals and Alloys* (January, 1944) 19:206.

A16 AIRCRAFT ENGINEERING (July, 1942) 14:181

Statistical control of quality.

Reference to publication by British Standards Institution of manuals B.S. 600 (now 600R) *The Use of Quality Control Charts* and B.S. 1008 *Place of Quality Control in a Work's Organization.*

A17 ———— (July, 1942) 14:203-209

Quality control in Curtiss-Wright plants. J. W. Dunn.

Explains that 152,000 inspections are required on one pursuit plane. Gives the organization charts of company and of quality-control department at two Buffalo plants. Explanation of the place of the quality-control department and its duties. Salvage control is considered of great importance; carefully explained with figures of forms used. Seventeen illustrations of inspectors at work.

A18 ———— (February, March, April, 1943) 15:55-58, 85-90, 115-119

Quality control in production engineering. H. Rissik.

First three of a series of five excellent articles. (1) Lays stress on the importance of the techniques of quality control to modern production engineering processes, and discusses basic principles of these methods. (2) Discusses process inspection as basis of quality control. Application to machine shop production. Operational principles involved. How control charts for the shop are used. Explanation of control ratio and tolerance factor. (3) Explains a method of quality control based on the use of limit gauges and gives control chart applications. Charts and tables.

A19 ———— (May, June, 1943) 15:149-151, 179-182

Sampling inspection and quality determination. H. Rissik.

Last two of a series of five articles. Why engineers should utilize quality-control techniques. The general problem of quality is discussed. Practical application is given showing how discrimination can be improved with proper sampling inspection. Application of "average outgoing quality level" double sampling plan is explained. Charts and tables.

A20 ———— (April, 1944) 16:119

Statistical control in the inspection of materials. Margaret Phipp.

Presents illustrations of records to be used in an inspection department, including stock record, index card, analysis card, specification record, and inspection note. Table and diagram.

A21 ———— (September, 1944) 16:265-267

Quality control and industrial development. R. H. S. Phillips.

A nonmathematical essay on experimental statistical analysis designed to interest the nonstatistical inquirer in the possibilities in the use of quality control where we are not primarily attempting production control to "specified limits" but to analyze "use quality" (functional efficiency), that is, the relative merits of different specifications in use. Discusses variables to be watched for effect on assembly quality. Discusses the development of "check-testing" as an essential of quality control. Outlines how data are collected and records kept. Statistical methods employed are named. Appendix and table sets forth a problem of deciding between a repair scheme and a renewal scheme. Table and 30-item bibliography.

A22 ———— (October, 1944) 16:305

Estimation of batch quality. T. J. Lunt.

Two charts are presented, one giving central estimate of batch fraction defective, and one giving two estimates of batch quality as represented by fraction defective. Based on Simon's *An Engineer's Manual of Statistical Methods.*

A23 ———— (June, 1945) 17:179-182

Quality control; some advantages of a system of fixed period renewal. R. H. S. Phillips.

Experience has shown the author that there is a lamentable lack on the part of manufacturing firms of appreciation of the value of periodic diagnosis of an intensive type with precise regular reports on the use-characteristics and life-dependability of their firm's components. Analysis of wartime failures of certain components shows that the conditions to which components are subjected in long and short flights are largely irrelevant to their failure. Quality has been to blame. Check-testing is useless without process quality control of the components in production. Discusses how quality control can assist in enabling a fixed period renewal scheme to be operated, first by establishing the approximate life of a given component in actual use, and second by the strictest possible sampling of production at each stage and also of the finished article. Two elaborate charts.

A24 AIRCRAFT PRODUCTION (April, 1943) 5:172-175

Quality control—recording the results of multi-dimensional inspection. W. A. Bennett and J. W. Rodgers.

Method of inspection of small machined parts produced in mass production. Problem of short time cycles and how inspection is accomplished. Record cards are illustrated and the control chart is explained. Based on a system adopted by The English Needle and Fishing Tackle Co., Ltd. Charts.

A25 ———— (August, 1943) 5:359-363

Quality control—application to small-quantity output in the aircraft industry. K. Hayward.

An excellent nontechnical explanation of methods adopted by Bristol Aeroplane Co. in their machine shops. Details of control chart technique employed, personnel training plans, and handbook for quality-control work are given. Explains how statistical quality control has been applied in a plant having small-quantity output. A chart shows an outline of the quality-control process; data sheets and charts are illustrated and explained. See abstract in *Aeronautical Engineering Review* (October, 1943) 2:117.

A26 ———— (December, 1943) 5:579-584

Stabilized quality control. H. Howell.

Practical suggestions are given for simplifying and correctly applying the system. Quality control should be approached as a check upon the production process more particularly than as a check upon the product for the sake of more prompt clarification and stabilization of the technique in the workshop. Suggests quality-control process record; explains its use; gives detailed meaning of the data thereon. Construction of the quality-control chart. Details of a routine in applying the system to any machine shop quantity production process for the first time. Tables, diagrams, charts. See abstract in *Aeronautical Engineering Review* (February, 1944) 3:120.

A27 ———— (April, 1944) 6:198-201

Quality control: a review of three common misapplications of the system. H. Howell.

Explains three major examples of misapplication of the quality-control system and details why these "odd" tendencies should be abandoned. (1) the practice of trying to determine control limits by mere formula; (2) exclusive use of "go" and "not go" gauges and determination of control limits by the parameter percentage defective; (3) quality control by means of the parameter percentage defective using "go" and "not go" gauges made to control limits instead of drawing limits, as is the present practice. Explains need of essential knowledge about the behavior of the process and the need of measurement check data. Tables, diagrams, charts.

A28 ———— (June, 1944) 6:290-291

Quality control: a review of three common misapplications of the system. H. Howell.

Discussion of the article appearing in the April, 1944, issue, 6:198-201.

A29 ———— (January, February, 1945) 7:33-36, 65-69

Quality control. H. Howell.

Part I presents an interesting application for the training of machine operators and setters. Part II discusses the interpretation and analysis of results obtained from the new training technique.

A30 ———— (May, 1945) 7:216-218

Quality control applied to die casting.

Novel use of quality control as a check against porosity during manufacture. Reprint of an article in *Production and Engineering Bulletin* (April, 1945) 4:129-132, discussing the application of quality control in the production of zinc-base pressure die castings. Chart and illustrations.

A31 ———— (October, 1945) 7:475-477

Statistical quality control: some American views on its fundamental concepts. John M. Howell.

Not available for review.

A32 ———— (November, 1945) 7:539-543

Quality control: a comparison of compressed limit gauging methods with measurement check in dimensional quality control practice. H. Howell.

Not available for review.

A33 ———— (December, 1945) 7:563-564

Quality control and spot welding; application and value of statistical methods. N. G. Dodd.

Not available for review.

A34 AMERICAN CERAMIC SOCIETY, BULLETIN (November, 1935) 14:355-359

Quality control. F. M. Thorman.

A general discussion of the value of quality as a factor in advertising. Offers a broad plan for its maintenance in the ceramic industry; no mention of modern statistical quality control.

A35 AMERICAN CERAMIC SOCIETY, JOURNAL (1927) 10:133

Statistical methods in ceramic research. A. E. R. Westman.

An explanation of the fundamental objects of ceramic research; need for development of new methods particularly fitted to solve the basic problems. Two classes of methods, exact and statistical are described; brief description with examples of some of the modern statistical methods, pointing out a few situations in which these methods could be used to advantage in ceramic research.

A36 ———— (1930) 13:354

The interpretation of plant and laboratory test data. R. Ferguson.

If modern statistical methods are applied, plant and laboratory test data may often yield more information than otherwise. This article introduces elementary measures such as averages, dispersion measures, the concept of error, effective average, and the comparison of two means.

A37 ———— (October, 1937) 20:329-336

Concerning the strength of the weakest bottles (applicability of the normal curve of errors to statistical analyses of strength tests of glassware). F. W. Preston.

Through destructive tests of a large number of samples the applicability of the "normal curve" to pressure testing and thermal shock testing of glassware was found to fit sufficiently well to justify use of average, probable errors, and standard deviations for comparison of results between investigators. Bottles are somewhat better in practice than the "normal curve" of frequencies would imply. Discussion of adequacy of samples of various sizes. Meaning of "secular drift."

A38 ———— (December 1, 1944) 27:373-387

Refined method of control of cordiness and workability of glass during production; statistical control charts of daily measurements of density. L. G. Ghering.

Explains with great care and complete illustrations how the control chart method of statistical analysis is applied to data from ten glass furnaces for maintaining a state of statistical control of density during production. Shows how these charts indicate trouble and gives reasons found for the lack of control indicated. Time required to maintain a chart for one furnace is given as about one day for past data analysis, one minute per day for plotting, and not more than one day per month for current analysis, review, and adjustment. Charts and tables.

A39 AMERICAN DYESTUFF REPORTER (April 29, 1940) 29: 217-220

Scientific approach to textile problems. A. C. Walker.

Describes use of control chart of cable paper aging tests and application of statistical methods to textile problems. Points out that scientific methods may be used with considerable profit to study even the simplest and most common industrial process which has been accepted as being economical and satisfactory. Diagrams.

A40 ———— (November 20, 1944) 33:486-491

The interpretation of laboratory tests as quality indices in textiles. A. G. Ashcroft.

Growth of laboratory testing; the textile industry—postwar; increasing demand for tests; a conservative use of tests needed; misuse of laboratory tests; types of quality criteria (the three types described by Shewhart in "Some Aspects of Quality Control," *Mechanical Engineering*, December 1934); problems of interpretation; new attitude toward tests, with eight rules to follow; need of developing a science of test method presentation, with seven points outlined. Discussion follows.

A41 AMERICAN FOUNDRYMEN'S ASSOCIATION (December, 1942) 50:611-636

Statistical methods as aid to control of foundry operations. H. H. Fairfield.

Discusses what information may be obtained from operating records and how it may be analyzed to bring to light the fundamental law governing the process being examined. Many prejudices, customs, and arbitrarily imposed standards may be found to be in error. Statistical records make it possible to see which variables have changed from their quality level so correction can be applied at once. Illustrations used were mainly confined to graphically showing the relation between casting qualities and production variables. Charts.

A42 AMERICAN JOURNAL OF PHYSICS (June, 1944) 12:157-159

Quality control by statistical methods: a field for physicists. R. H. Bacon.

This short article points out to physics students and industrial physicists the value of acquiring training in the application of statistical methods to the problems of the control of the quality of industrial products. Explains a simple problem in quality control and states advantages of statistical methods of control. Diagrams.

A43 AMERICAN MACHINIST (November 7, 1929) 71:777-779

Trends in standardized quality production. J. H. Van Deventer.

The place of quality control in modern "standardized quality production" as a factor in developing production control as embodied in modern production engineering.

A44 ———— (October 26, November 9, 1932) 76:1085-1088, 1129-1131

Statistical control in sampling inspection. H. F. Dodge.

An excellent article containing practical examples of the application of inspection criteria of attributes and variables to production control and customer protection. Discusses the amount of consumer protection afforded by various-sized samples using variables and attribute criteria. Also discusses the efficient use of inspection data. Charts.

A45 ———— (May 28, 1942) 86:496-499

Inspecting bolts, nuts, and screws—Lamson and Sessions Co. plants.

Explains inspection procedure with twelve illustrations. Not a statistical article but one which should be of interest to all who are working with process inspection.

A46 ———— (December 10, December 24, 1942) 86:1430-1432, 1498-1500

Refined quality control. John Gaillard.

A very good description of the scientific approach to quality control. What control is; when quality is controlled; what a quality control chart is; the use of quality control chart to define acceptable working limits and the narrower control limits, and to show at once when the quality of a part threatens to go "out of control." Illustrations and diagrams. See *Industrial Standardization* (April, May, 1943) 14:123-127, 155-158.

A47 ———— (April 29, 1943) 87:78-81

Quality control will reduce costs; manufacturing operations at Westinghouse Electric and Manufacturing Co. J. Manuele.

Explains how inspection of parts during early production stages will help hold rejections to a minimum; permits averaging of errors in dimensions, changing tool set-ups or designs in the light of findings. Outlines detailed steps in the inspection process. Charts and tables.

A48 ———— (October 28, 1943) 87:92-93

Putting quality into quantity; quality control based on rules of probability. L. T. Rader.

Application of quality control to mass production necessitates carefully laid out schedule; quality control based on laws of probability enables advance determination of the number of satisfactory parts produced. Brief introduction to the basic idea of quality control. Diagrams.

A49 ———— (August 30, 1945) 89:126-127

Statistical control of assemblies eliminates selective fitting. Benjamin Epstein.

Discussion of method used by Westinghouse Electric and Manufacturing Co. whereby the advantages of statistical control are extended to complex situations involving a number of variable factors controlling cumulative dimensional deviations of assemblies where the actual dimension over a span of components is determined by the accumulation of dimensions of the individual components.

A50 ———— (September 27, 1945) 89:126-128

Recorded tests prove effective in maintaining welding quality; Lockheed Aircraft Corporation. J. Holden.

Presents forms and methods used for maintaining quality control of aluminum spot welding projects. Does not involve chart showing statistical limits of tolerance—process control methods.

A51 AMERICAN MATHEMATICAL MONTHLY (May, 1931) 38: 245-270

Random sampling. Walter A. Shewhart.

Sampling theory as seen through the eyes of a practical engineer. How the theory can be used to economic advantage. Charts, tables, illustrations. For full coverage of the material in this article see Bell Telephone Laboratories (June, 1930) monograph No. 496; and the author's book, *Economic Control of Quality of Manufactured Product*, 1931.

A52 AMERICAN SOCIETY FOR TESTING MATERIALS, BULLETIN (December, 1944) No. 131:27-31

The interpretation of laboratory tests as quality indices in textiles. A. Griffin Ashcroft.

Discussion of the growth of laboratory testing, the increasing demand for tests; conservative use of tests needed. Outlines the three main types of quality criteria, namely: Type I—which characterizes a thing independent of all other things and of human volition and interest; Type II—that

which characterizes a thing A in its relation to another thing B and independent of human volition and interest; and Type III—that which makes a thing wanted by some group of people; its wantableness. Explains savings to be made through diverting the effort now expended on measuring comparative ultimate consumer value in the direction of improved real values. This would benefit the consumer. A new attitude desired for tests; development needed of a science of test method presentation. Bibliography.

A53 AMERICAN SOCIETY FOR TESTING MATERIALS, PROCEEDINGS (1929) 29, part 1:200-210

Basis for analysis of test results of die-casting alloy investigation. Walter A. Shewhart.

A practical illustration is given involving the interpretation of a number of sets of data. It is shown how these data may be reduced to a few simple functions containing the essential information, and how these functions may be used and interpreted. How to use the three functions of mean, standard deviation, and correlation coefficient (1) to determine whether or not observed variations between sets of data should be left to chance; (2) to establish standards for physical properties of raw material; (3) to establish a basis for control of product. Charts and tables.

A54 ———— (1932) 32, part 2:468-474; discussion 475-476

Controlled data from an immersion test. R. F. Passano.

Meaning of "good" data. Essential conditions of tests. Data from controlled tests and conclusions to be drawn therefrom. Charts and tables.

A55 ———— (1932) 32, part 2:670-675

Application of control analysis to the quality of varnished cambric tape. M. K. Skinker.

Explains why better methods of making the product tested or better methods of sampling it, or both, must be found or it remains impossible for the user to satisfy himself from a few sample tests that he is getting a good quality product. Uniformity is held to be more important than high average value.

A56 ———— (1934) 34, part 2:877-890

Acceptance-rejection requirements in specifications. H. F. Dodge.

Discussion of significance of two simple criteria of acceptance and rejection sometimes incorporated in specifications in connection with requirements imposed on individual quality characteristics of a product or material. One kind of risk is discussed, and the relationship between (1) the distribution of risk between producer and consumer; and (2) the choice of acceptance criteria and sample size is indicated for certain conditions. Diagrams.

A57 ———— (1934) 34, part 2:891-909; discussion 910-919

Application of statistical methods to the solution of metallurgical problems in the steel plant. W. C. Chancellor.

An excellent article with numerous charts, demonstrating why statistical quality-control methods are particularly appropriate for use in steel

plants. Practical examples are given of the use of quality-control charts. A discussion of statistical methods follows the main article. Charts and tables.

A58 ———— (1938) 38, part 2:647-654; discussion 655-657

Statistical methods as an aid in revising specifications. N. C. Wiley.

A practical article on statistical method from the engineer's viewpoint. Worked-out examples are given. Diagrams.

A59 AMERICAN SOCIETY OF MECHANICAL ENGINEERS, TRANSACTIONS (July, 1942) 64:521-527

On some of the essentials of control chart analysis. E. G. Olds.

An excellent article on the use of quality-control charts by an experienced teacher of statistical quality control. Charts and tables with examples from controlled processes and processes with trouble introduced are presented. Discussion on page 527.

A60 ———— (April, 1943) 65:222-225

Ten years progress in management; statistical control in applied science. Walter A. Shewhart.

A brief survey of the developments in statistical control that are of interest from the viewpoint of management. A summary of contributions to mass production by use of statistical control. Needs and requirements of an adequate science of control. Draws contrast between statistical control theory and classical statistical theory.

A61 ———— (February, 1944) 66:127-133

Sampling inspection plan for continuous production. H. F. Dodge.

A technical discussion of a plan of sampling inspection intended primarily for use in process inspection where there must be assurance that the percentage of defective units is kept down to a low prescribed figure. Particularly adaptable to manufacture by straight-line continuous processes. The object of the plan is establishment of a limiting value of average outgoing quality expressed as a percentage of defective units, which will not be exceeded regardless of the quality submitted for inspection. Charts and tables. See *Annals of Mathematical Statistics* (September, 1943) 14:264-279.

A62 AMERICAN SOCIETY OF NAVAL ENGINEERS, JOURNAL (August, 1943) 55:573-579

Sampling and quality control. W. Edwards Deming.

Explanation of variations in nature, and definition of a chance cause system. Meaning of randomness, statistical control, and technical control. The fundamental problem of mathematical statistics is to set tolerances. The Shewhart method of control. Opportunities of mathematical statisticians in industry and details of a seven-point program for bringing about their greater usefulness in industry. See *Science* (March 5, 1943) 97:209-214 for complete address.

A63 ———— (August, 1944) 56:422-431

The industrial lot and its sampling implications. Leslie E. Simon.

Reprint of a paper by the same name from *Journal of The Franklin Institute* (May, 1944) 237:359-370. Points out that predictions of lot quality predicated on small samples are invalid in the absence of assurance of a knowable relation between the inspected sample and the uninspected remainder. Discusses how to obtain assurance of the existence of such a relation. There are three degrees of efficiency in making quality predictions explained. (1) Small random samples taken at an earlier time and at a different place may be inspected. Quality prediction of very little value. (2) Whole of alleged lot available for inspection may be divided into arbitrary strata, sampled, and criterion of control applied. Knowledge of validity of prediction available but no efficient correction measures are possible if lot appears to be nonhomogeneous. (3) Small samples taken in order of production—criterion of control applied. Valid lot-quality predictions are possible and efficient division of flow of production into true lots is automatically obtained without additional cost.

A64 ———— (February, 1945) 57:21-55

The application of statistical methods to the development and quality-control of high tensile steel. Charles M. Mottley.

Exposition of how the Bureau of Ships through establishment of a quality-control unit using modern methods of statistical analysis for handling large masses of complicated data, established a sound basis for initiating effective action by the steel industry in changing over from production of manganese-vanadium steel to manganese-titanium steel and back to a new high tensile steel called manganese-titanium-vanadium. How the data were collected and handled with interpretation of the results bearing on chemical composition, physical properties, and weldability. Control charts are illustrated and explained. Composition of a consumers quality-control unit should contain an engineering group and an analytical group. Details of their desirable qualifications and what should be expected of these two groups. Charts and tables.

A65 AMERICAN STATISTICAL ASSOCIATION, JOURNAL (December, 1925) 20:546-548

Application of statistics as an aid in maintaining quality of a manufactured product. Walter A. Shewhart.

A note emphasizing the use of statistical methods to control quality of manufactured products as a comparatively new field of application. An early statement by the founder of modern quality-control techniques setting forth the basic idea behind the statistical methods of quality control.

A66 ———— (June, 1928) 23:144-153

Small samples, new experimental results. Walter A. Shewhart and F. W. Winters.

A mathematical discussion of the practical problem of estimating the error of the average obtained from a small sample. Success of "Student's" theory for normal universe; theoretical reasons for failure for nonnormal universe. Need for correction in application of "Student's" theory under conditions of a nonnormal universe. Results of experiments made.

A67 ———— (September, 1931) 26:262-269

Statistical method from an engineering viewpoint. Walter A. Shewhart.

A critical discussion of statistical methods as applied to engineering problems, the problem of engineering statistics in obtaining good data. Three postulates of statistical method. Application of quality-control chart to help solve problems of variation in manufactured product.

A68 ———— (March, 1936) 31:37-42

Bases of control for industrial operation. Fairfield E. Raymond.

Discussion of control of methods of production, of selection and replacement of equipment, and of money; points out the primary importance of control of quality in the problem of efficient control of incoming materials. Quality of product going to the consumer is based upon knowledge of customer wants through marketing research, which in turn enables the process division to issue production standards against which the inspection division can check for their measure of quality.

A69 ———— (June, 1936) 31:361-366

Statistical method and industry in Great Britain. E. S. Pearson.

Credit is given to Shewhart's visit to England in 1932 for impetus to and interest in the use of statistical methods in industry there. Cites objectives of British Standards Institution and of Department of Statistics of University College, London, and the work of the Industrial and Agricultural Research Sections of the Royal Statistical Society.

A70 ———— (March, 1941) 36:50-52

The importance of the statistical viewpoint in high production manufacturing. P. L. Alger.

States the purpose of quality-control expert's work and the relationship between the engineering and statistical viewpoints in their control of quality.

A71 ———— (March, 1941) 36:53-60

On the initiation of statistical method for quality control in industry. L. E. Simon.

Practical steps are outlined which may help to "sell" statistical methods to management of industry. Necessity of devising simple procedures which may be applied by persons other than the statistician if there is to be an immediate use of statistical methods for quality control on a large scale. See *Management Review* (September, 1941) 30:335-336, for abstract of above article.

A72 ———— (September, 1941) 36:351-360

On sample inspection in the processing of census returns. W. Edwards Deming and L. Geoffrey.

Shows the application of quality-control techniques to office work in the Bureau of the Census. Cites savings to be made in cost of inspection and verification of punch cards under conditions of their mass production such as is found in the Bureau of the Census. Charts.

A73 ———— (June, 1942) 37:173-185

On a classification of the problems of statistical inference. W. Edwards Deming.

An excellent article showing the relationship between evidence, prediction, degree of belief, action, and possible consequences of action. Description of two main types of statistical problems. Importance of design of experiments. Article is not directly on statistical quality control but should be of interest to all statisticians. Diagram. See comment by L. A. Salter, Jr., in this journal (December, 1942) 37:540-542.

A74 ———— (September, 1942) 37:313-324

Application of statistical methods to ordnance engineering. L. E. Simon.

An explanation of control-chart methods as applied to proving-ground measurements. Description of practical problems encountered and demonstration of the usefulness of control charts.

A75 ———— (December, 1942) 37:540-542

Comment on Deming's classification of problems of inference. L. A. Salter, Jr.

Supports the ideas set forth in main article by W. Edwards Deming (June, 1942) 37:173-185. States that Deming exposes a basic error in the type of research procedures which have been emphasized during the past twenty years. Calls for a full reappraisal of customary techniques.

A76 ———— (March, 1943) 38:93-100

On the efficiency of deep stratification in block sampling. W. Edwards Deming, W. N. Horwitz, J. B. Tepping.

Explains stratification with complete sampling and deep stratification with incomplete sampling. Presents the results of part of a series of investigations being carried out on the experimental and theoretical evaluation of the sampling errors and biases of several sample designs involving deep stratification, and makes comparison of them with some sample designs commonly used. Table shows standard errors and biases of the various sampling plans for selected characteristics of the population.

A77 ———— (June, 1943) 38:228-232

Quality control applied to business administration. W. B. Rice.

The adaptation of techniques of quality control to problems of office and financial management. A practical example of how office overtime might be controlled by use of the quality-control chart. Quality-control methods develop a basis for executive decisions. They may be used in the office as well as in the factory.

A78 ———— (December, 1943) 38:466-470

Method for determining the significance of a shortage. L. F. Knudsen.

A quick and easy method reported by a member of the Food and Drug Administration for coming to a decision as to whether a lot sampled is significantly short-weighted. Includes a table with derivation of formulae and table used. Bibliography.

A79 ———— (September, 1944) 39:311-324

Analysis of the data of a public health organization by the control chart method. Walter Schilling.

Use of quality-control charts as a rapid method of discovering the presence of heterogeneity in data. Control is effected in the number of visits through determination of genesis of causes. Diagrams and bibliography.

A80 ———— (September, 1944) 39:325-334

Matters of misconception concerning the quality control chart. E. M. Schrock.

Fourteen practical questions that have been raised concerning the use and interpretation of quality-control charts are listed with the author's answers thereto. Charts.

A81 ———— (June, 1945) 40:214-222

Application of control chart method to the testing and marketing of foods. S. Marcuse.

Describes how control charts can be used to analyze test results in the field of experimental food research. Discusses the application to food testing by a panel of tasters. The control-chart method can aid in the selection of individual tasters who make the most valid and stable judgments and at the same time enables the experimenter to evaluate the tasting results continuously. Also, the method is useful in grading the quality of food products objectively according to a fixed standard.

A82 ———— (September, 1945) 40:277-306

Sequential method of sampling for deciding between two courses of action. Abraham Wald.

This paper presents a new method of sampling wherein a rule is given for making a decision at any stage of the experiment (at the n-th trial for each integral value of n): (1) to take action 1, (2) to take action 2, (3) to continue the experiment by making an additional observation. The experiment is thus carried out sequentially. The author presents fundamentals of this important advance in method together with some illustrations and examples. A mathematical exposition of several types of sequential probability ratio sampling plans involving sampling by attributes and variables. Diagrams and tables.

A83 ———— (September, 1945) 40:377-378

Book review of *A.S.T.M. Manual on Presentation of Data: Including Supplement A, Presenting plus and minus Limits of Uncertainty of an Observed Average; Supplement B, "Control Chart" Method of Analysis and Presentation of Data; and Tables of Squares and Square Roots.* Review by Eugene L. Grant.

A84 ———— (September, 1945) 40:379-480

Book review of *Guide for Quality Control and Control Chart Method of Analyzing Data.* American War Standards Z1.1-1941 and Z1.2-1941; and *Control Chart Method of Controlling Quality During Production.* American War Standards, Z1.3-1942. Review by Frederick Mosteller.

A85 ———— (September, 1945) 40:382-384

Book review of *Sampling Inspection Tables: Single and Double Sampling* by H. F. Dodge and H. G. Romig. Review by Kenneth J. Arnold. See reviews in *Mechanical Engineering* (April, 1945) 67:276-277 by E. L. Grant; *Nature* (April 14, 1945) 155:438-439 by M. G. Kendall.

A86 ———— (September, 1945) 40:386

Book review of *Quality Control Chart Techniques When Manufacturing to a Specification: With Special Reference to Articles Machined to Dimensional Tolerances* by B. P. Dudding and W. J. Jennett. Review by Harold A. Freeman.

A87 ———— (September, 1945) 40:386

Book review of *Quality Control Charts: Being Part 1 of the Revision of B.S. 600:1935, The Application of Statistical Methods to Industrial Standardization and Quality Control. B.S. 600R:1942,* by B. P. Dudding and W. J. Jennett. Review by Harold A. Freeman.

A88 ———— (September, 1945) 40:395-396

Book review of *Management of Inspection and Quality Control* by J. M. Juran. Review by A. I. Peterson. See reviews in *Mechanical Engineering* (June, 1945) 67:417; *Industrial Quality Control* (July, 1945) 2, No. 1:18-19 by M. A. Brumbaugh.

A89 ———— (September, 1945) 40:403-404

Book review of *A First Guide to Quality Control for Engineers* by E. H. Sealy. Review by W. Edwards Deming.

A90 ———— (September, 1945) 40:408-409

Book review of *Statistical Methods in Industry* by L. H. C. Tippett. Review by P. S. Olmstead.

A91 ———— (September, 1945) 40:411-413

Book review of *Quality through Statistics* by A. S. Wharton. Review by H. F. Dodge.

A92 ———— (September, 1945) 40:413-415

Book review of *A Guide to Utilization of the Binomial and Poisson Distributions in Industrial Quality Control* by Holbrook Working. Review by H. G. Romig.

A93 ———— (March, 1946) 41:111-112

Review of *Industrial Quality Control,* bimonthly magazine published by the American Society of Quality Control. Review by S. B. Littauer.

A94 ———— (March, 1946) 41:112-115

Review of *Industrial Quality Control* magazine. Review by Holbrook Working.

A95 ———— (March, 1946) 41:115-118

Review of *Quality Control Reports, Nos. 1-12,* published by Quality Control Program, Carnegie Institute of Technology, for Office of Production Research and Development, War Production Board. Review by George W. Brown.

A96 ———— (March, 1946) 41:118-121
Review of *Quality Control Reports, Nos. 1-12.* Review by Louis C. Young.

A97 ———— (March, 1946) 41:121-123
Review of *Symposium of Papers on Statistical Quality Control,* published by the Quality Control Panel, Birmingham District Production Committee, Ministry of Production, Birmingham, England. Review by Irving W. Burr.

A98 ———— (March, 1946) 41:123-125
Review of *Symposium of Papers on Statistical Quality Control.* Review by Paul Peach.

A99 ———— (March, 1946) 41:125-127
Review of *Industrial Experimentation,* published by Directorate of Royal Ordnance Factories (Explosives), Ministry of Supply. Review by John W. Tukey.

A100 ———— (March, 1946) 41:127-128
Review of *Industrial Experimentation.* Review by J. Wolfowitz.

A101 ———— (March, 1946) 41:130-132
Review of *Statistical Methods in Quality Control* by P. C. Clarke and G. R. Armstrong, published by Hunter Pressed Steel Company, Lansdale, Pa. Review by G. R. Gause.

A102 ———— (March, 1946) 41:133-135
Book review of *An Introduction to Industrial Statistics and Quality Control* by Paul Peach. Review by J. H. Curtiss.

A103 ———— (March, 1946) 41:137-138
Book review of *Sequential Analysis of Statistical Data: Applications* by the Statistical Research Group, Columbia University, for the Applied Mathematics Panel, National Defense Research Committee, Office of Scientific Research and Development. Review by Henry Scheffé.

A104 ———— (March, 1946) 41:138-140
Book review of *Sequential Analysis of Statistical Data: Applications.* Review by B. L. Welch.

A105 ANNALS OF MATHEMATICAL STATISTICS (March, 1939) 10:88-90
The future of statistics in mass production. Walter A. Shewhart.
Points out that the future contribution of statistics in mass production lies not so much in solving the problems usually put to the statistician today by those not statistically trained as in taking a hand in helping to coordinate the steps of specification, production, and inspection considered as a scientific experiment for making the most efficient use of human effort in the production of goods to satisfy human wants.

A106 ———— (September, 1940) 11:363-366
Note on theoretical and observed distribution of repetitive occurrences. P. S. Olmstead.
Whenever a new type of apparatus or a new design of an old type is installed, an engineer may wish to know (1) How many times will it per-

form its intended function without failure? (2) How many times will it fail to perform its intended function in a given length of time? This article explains how to obtain answers to these questions which are of importance in control of quality of manufactured products. Criteria for identifying significantly long and short lengths for individual test runs and high or low average lengths for groups of runs for constant probability repetitive processes. See Bell System Technical Publications, Reprint B-1261.

A107 ———— (March, 1941) 12:91-96

Determination of sample sizes for setting tolerance limits. S. S. Wilks.

A very important article from the viewpoint of control. A mathematical discussion of how we can determine the size of a sample to use in order that the proportion P of the universe included between tolerance limits L_1 and L_2 have an average value a, and will be such that the probability is at least p that P will lie between two given numbers, say b and c.

A108 ———— (June, 1941) 12:153-162

The mean square successive difference. J. Von Neumann, R. H. Kent, B. I. Hart.

Suggests the mean square successive difference as a rather simple method of minimizing the effect of a gradual shifting of the mean of the population on dispersion. Where standard deviation may be held constant but the mean of samples varies, correction must be made for such variation of the mean or the estimated standard deviation will tend to be larger than the true population value. When the variation is gradual, so that a trend (which need not be linear) is shifting the mean of the population, a simple method of minimizing the effect of the trend on dispersion is to estimate standard deviation from differences.

A109 ———— (June, 1941) 12:228-232

Note on an application of runs to quality control charts. F. C. Mosteller.

Discussion of the mathematical basis of tests of control using runs above or below the median. A table is provided for samples of various sizes at the significance levels .05 and .01. Also one giving the probabilities of getting at least one run of s or more on *one* side, *either* side, and *each* side of the median for samples of 10, 20, and 40.

A110 ———— (September, 1941) 12:293-300

On randomness in ordered sequences. L. C. Young.

A method is described of a test for the presence of nonrandom variability in an ordered sequence of measurements. The measure is derived and table of significance levels and sample sizes is given.

A111 ———— (December, 1942) 13:400-409

Statistical prediction with special reference to the problem of tolerance limits. S. S. Wilks.

Discusses the problem of determining the accuracy of predictions as to how many future product-pieces will fall within tolerance limits specified

by measurements on product-pieces already produced under the given state of control.

A112 ———— (March, 1943) 14:45-55

Extension of Wilks' method for setting tolerance limits. A. Wald.

See "Determination of Sample Sizes for Setting Tolerance Limits" by S. S. Wilks, this journal (March, 1941) 12:91-96.

A113 ———— (March, 1943) 14:66-87

Tables for testing randomness of grouping in a sequence of alternatives. F. S. Swed, C. Eisenhart.

Tables are given for testing whether two samples constitute independent random samples from the same population. Of usefulness in testing runs shown by quality-control charts.

A114 ———— (March, 1943) 14:90-93

Note on tolerance limits. E. Paulson.

Points out a relationship between tolerance limits and confidence limits (used in the sense of Neyman), and establishes tolerance limits when the product is described by two qualities the measurements on which are assumed to have a bivariate normal distribution.

A115 ———— (March, 1943) 14:96-97

Stanford courses in statistical methods of quality control.

A statement of the courses offered by Stanford University in this field.

A116 ———— (June, 1943) 14:202-203

Special courses in statistical quality control.

Notice of program furthered by the War Production Board and the U. S. Office of Education. Progress made to date. See also this journal (March, 1943) 14:96-97.

A117 ———— (September, 1943) 14:264-279

A sampling inspection plan for continuous production. H. F. Dodge.

Presents a special purpose plan applicable to characteristics subject to nondestructive inspection on a "go" and "not go" basis for use in process inspection of parts and final inspection of finished articles within a manufacturing plant where it is desired to have assurance that the per cent of defective articles in accepted product will be held down to some prescribed low figures. It presumes a continuous flow of consecutive articles or consecutive lots of articles presented for inspection. Charts. See also *American Society of Mechanical Engineers, Transactions* (February, 1944) 66:127-133.

A118 ———— (September, 1943) 14:280-288

On the theory of runs with some applications to quality control. J. Wolfowitz.

Discusses recent developments in the theory of runs and some statistical applications of runs. Points out some of the problems yet to be solved in the theory of runs.

A119 ———— (December, 1943) 14:363-377

Multiple sampling with constant probability. W. Bartky.

Probability formulae are derived for an inspection procedure for infinite lots in which the number of additional samples is not limited and may be any number depending upon the results of the sampling. A basic article in the literature of sequential sampling. Tables.

A120 ———— (December, 1943) 14:415-425

Dependence of sampling inspection plans upon population distributions. A. H. Mood.

Contrasting the techniques of Dodge and Romig which are particularly valuable when a probability distribution does not exist, that is, when production is not statistically controlled, this article investigates the inspection of lots which may be regarded as having been drawn from a statistical population with emphasis on the utilization of the knowledge accumulated from successive samplings. Points the way to more efficient inspection procedures in statistically-controlled production utilizing knowledge gained from past drawings.

A121 ———— (March, 1945) 16:30-49

Sampling inspection plans for continuous production which insure a prescribed limit on the outgoing quality. A. Wald and J. Wolfowitz.

A mathematical explanation of such plans as "go"—"not go," average outgoing quality, simple inspection applicable to continuous production with proofs of their effectiveness.

A122 ———— (June, 1945) 16:117-186

Sequential tests of statistical hypotheses. A. Wald.

A mathematical exposition of this new method of testing hypotheses. Part I deals with sequential test of a simple hypothesis against a single alternative, and Part II the sequential test of a simple or composite hypothesis against a set of alternatives. Article contains discussion of current test procedure, general description of sequential test procedure, the sequential probability ratio test and number of observations required by the sequential probability ratio. Test of a simple hypothesis against one-sided alternatives and an outline of a general theory of sequential tests of hypotheses when no restrictions are imposed on the alternative values of the unknown parameters.

A123 ARMY ORDNANCE (March-April, 1941) 22:489-492

Statistical methods and quality. L. E. Simon.

Concerns statistical quality control in the manufacture of munitions. The contribution of statistical method to the development and use of specifications is shown by analyzation of conditions which exist in the absence of statistical method.

A124 ———— (November-December, 1942) 23:482-485

Quality control of munitions. The modern ounce of prevention applied to ordnance. G. D. Edwards.

A description of quality control as used in munitions manufacture. Application of an approach and a point of view to an inspection problem. The modern technique that moves inspection up closer to the beginning of the production cycle and seeks to determine the reason for defective material before a large quantity of a product has been made is set forth in this article. See also *Mechanical Engineering* (September, 1942) 64:673-675; abstract in *Metals and Alloys* (January, 1943) 17:206; abstract in *Metal Progress* (March, 1943) 43:426.

A125 ———— (March-April, 1943) 24:290-292

Standardized inspection; quality control methods applied to the acceptance of ordnance. R. J. Saunders.

Rule-of-thumb methods give way to scientific acceptance-inspection procedures designed on a quality-control basis. Standard sampling-inspection plans, applied to materials produced in quantity on the "go"–"not go" basis, in which category fall most items of ammunition made by private industry. Outlines specific procedure of ordnance inspectors plan of inspection. Table.

A126 ———— (July-August, 1943) 25:117-120

Quality through inspection. G. Rupert Gause.

Standardized control methods insure acceptable ordnance matériel. How the ordnance department applies quality control. Quality control is defined to mean the scientific arrangement of inspection procedures and the efficient use of inspection results. Tables.

A127 AUTOMOBILE ENGINEER (August, 1941) 31:255-262

Quality control; some aspects of the inspection systems at the Ford Motor Company, Ltd.

Presents eighteen illustrations of gauges and set-ups for checking and testing parts. Not on the statistical aspects of quality control.

A128 ———— (January, 1942) 32:31-32

Inspection systems; methods for controlling quality on large-scale production.

Value of statistical methods for random percentage check on inspection. Low percentage sampling will give a very accurate idea of the bulk lot through the use of these methods. Need for separation of inspection department from under control of production engineer. Description of floor, gauge, and dispatch inspection. Need for analysis of rejects.

A129 ———— (March, 1942) 32:109-113

Sampling inspection; methods of applying statistical analysis for quality control. B. P. Dudding.

This excellent article shows the application of statistical methods in the field of engineering inspection and quality control. Numerous examples are worked out to show sampling procedure under various conditions of the manufacturing system. Tables.

A130 ———— (January, 1944) 34:33-35

Quality control; application of statistical methods to inspection systems.

Explains the meaning of quality control and compares the patrol system of inspection with that of statistical quality control. Explains what quality control charts are and the benefits to be derived from their use. Gives some of the criticisms of statistical quality control and makes answer thereto. Illustrates the practical application of the system at Bristol Aeroplane Co.

A131 AUTOMOTIVE AND AVIATION INDUSTRIES (January 1, 1944) 90:38-40

Quality control through shop teamwork—Ryan Aeronautical Co. B. Holland.

A nonstatistical article showing the duties of the quality-control department.

A132 AUTOMOTIVE INDUSTRIES (March 21, 1931) 64:470-474

Sampling inspection maintains economic levels of quality at the Western Electric Plant. J. Geschelin.

Consideration of the possibilities of quality control based on statistical methods. Discussion of the sampling system used by this plant; description of universal double-sampling scheme in use; when to apply sampling. Charts.

A133 ———— (August 6, 1932) 67:166-169

Statistical method points to process control by spotting variables in manufacture. J. Geschelin.

Application of modern theory to show engineer what are good data and which observations should be rejected, thus assuring control of variables within reasonable limits. Illustrates the use of quality-control charts. Examples to show need of process-control charts. Diagrams.

A134 ———— (July 14, 1934) 71:42-45

Statistical methods provide engineers with a practical tool for control of quality. J. Geschelin.

A brief review of papers by H. F. Dodge, W. C. Chancellor, R. L. Templin, and R. L. Kenyon before the American Society for Testing Materials. Description of a technique which has been proved to be of great value in industrial research, inspection, and the control of manufacturing processes. Charts and diagrams.

A135 ———— (February 5, 1938) 78:172-179

Quality control at Perfect Circle. J. Geschelin.

An illustrated article covering inspection procedures in all departments. Brief reference to statistical quality control on page 176.

A136 ———— (February 1, 1941) 84:128-129

Statistical method of quality control. J. Geschelin.

Outline of statistical method for control of materials and manufactured products, with examples of application. Popular educational presentation giving arguments for the use of statistical techniques in the control of quality in manufacturing. Illustrated.

A137 AVIATION (June, 1943) 42:160-162

Quality control keeps product standards high. B. Holland.

A nonstatistical article dealing with methods used at Ryan Aeronautical Co. Presents duties of the quality-control department; clarification of departmental duties; quality-control discrepancy report and how it is used in the system. Refers to the role played by statisticians. See abstract in *Aeronautical Engineering Review* (August, 1943) 2:123-124.

B1 BEAMA JOURNAL (May, 1942) 49:130-133

Statistical method of quality control. H. Rissik.

Gives a brief historical development of statistical quality control. Refers to the discussion at the joint meeting of the Institutions of Civil, Mechanical, and Electrical Engineers held in London, April 15, 1942. Bibliography.

B2 ———— (June, 1942) 49:163-167

Quality control in industry. H. Rissik.

Discusses the new viewpoint of inspection to prevent defective material rather than inspection after manufacture when scrap has been created. Presents the advantages of statistical quality control and explains the modern quality-control technique. Gives an outline of practical economic benefits of statistical quality control. See *Electrician* (March 27, 1942) 128:276-280.

B3 ———— (March, 1945) 52:102

Review of article on "Application of Statistics to Dielectrics" by C. M. Summers and K. E. Ross, *Electrical Engineering* (November, 1944) 63:405.

B4 BELL SYSTEM TECHNICAL JOURNAL (January, 1924) 3:43-87

Some applications of statistical methods to the analysis of physical and engineering data. Walter A. Shewhart.

This comprehensive article dealing with the basic theory of probability and the normal law of error is of interest to all students of statistical quality control. Deals with the application of elementary statistical methods for finding the best frequency distribution which is more probable than that given by the normal law. Points out limitations on theory of the law of errors based on normal law. Charts and tables.

B5 ———— (January, 1924) 3:88-99

Deviation of random samples from average conditions and significance to traffic men. E. C. Molina and R. P. Crowell.

Deals with the theory of sampling in its relation to telephone problems.

B6 ———— (January, 1926) 5:11-26

Correction of data for errors of measurement. Walter A. Shewhart.

A discussion of three important problems arising in engineering practice involving error correction of data (1) taken to show quality of a particular lot, (2) taken periodically to detect significant changes in quality of product, and (3) taken to relate observed deviations in quality of product to some particular cause. Diagrams.

B7 ———— (April, 1926) 5:308-319

Correction of data for errors of averages. Walter A. Shewhart.

A theoretical article discussing reasons why customary error theory cannot be used to calculate the error of the average of a small sample, and setting forth what should be used instead. Diagrams.

B8 ———— (October, 1926) 5:593-603

Quality control charts. Walter A. Shewhart.

This is the first published description of quality-control charts. Illustrates the definition of quality by characteristic; outlines basis for detecting lack of control. Presents problems of specification, estimation, distribution, and fit. Discusses practical application of theory. Charts.

B9 ———— (October, 1926) 5:604-624

Applications of Poisson's probability summation. Frances Thorndike.

A technical article discussing with diagrams and tables how the Poisson exponential can be used to describe many different kinds of distributions. See also *A Guide to Utilization of the Binomial and Poisson Distributions in Industrial Quality Control,* Holbrook Working, Stanford University Press, 1943.

B10 ———— (October, 1927) 6:722-735

Quality control. Walter A. Shewhart.

A mathematical article setting forth detailed methods for determining from inspection data whether or not a product is being controlled in the sense of indicating the presence of assignable causes of variations. Discusses specifications of control and the setting of control limits. Charts and nomograms.

B11 ———— (January, 1928) 7:26-69

Some general results of elementary sampling theory for engineering use. P. P. Coggins.

A very good article of instruction with examples, cases, and a mathematical appendix and key to charts. Twenty-six charts.

B12 ———— (April, 1928) 7:350-368

A method of rating manufactured product. H. F. Dodge.

Outlines method of statistical quality control; main objective is control of quality of finished product but also it measures workmanship of individuals and groups of operators. Use of quality-control charts in a problem of control of quality of finished products of particular interest in the tele-

phone business. Charts and tables with examples and mathematical appendix. See *Manufacturing Industries* (November, December, 1928) 16: 517-519, 613-615.

B13 ———— (October, 1929) 8:613-631

A method of sampling inspection. H. F. Dodge and H. G. Romig.

Outline of some general considerations which must be taken into account in setting up any practical sampling-inspection plan. An economical method of inspection is developed in detail for the case where the purpose of the inspection is to determine the acceptability of the discrete lots of a product submitted by a producer. Use of probability theory to avoid defective quality and to afford protection to the consumer with a minimum of inspection expense. Shows factors to be considered in establishing an inspection plan. Charts are presented for single-sampling. Illustrative examples included. See Bell System Technical Publications, Reprint B-431.

B14 ———— (October, 1929) 8:632-645

Frequency distribution of the unknown mean of a sampled universe. E. C. Molina and R. I. Wilkinson.

The purpose of this paper is to study in strict accordance with the theory of probability the conclusions which may be drawn concerning the true parameters of the unknown universe after a "sample of variables" of any size has been examined. Diagrams.

B15 ———— (April, 1930) 9:364-389

Economic quality control of manufactured product. Walter A. Shewhart.

Scientific basis for determining when economic limit is reached in eliminating unknown or chance causes of variability in the quality of product is discussed. When this state is reached the product is said to be under control because it is possible to set up limits within which the quality may be expected to remain in the future. This material forms part of a later volume entitled *Economic Control of Quality of Manufactured Product,* published in 1931. Fourteen figures. See Bell System Technical Publications, Reprint B-496.

B16 ———— (January, 1941) 20:1-61

Single sampling and double sampling inspection tables. H. F. Dodge and H. G. Romig.

These well-known tables have been developed for use in producer and consumer inspection of products composed of similar individual articles or pieces, where it is desired to have assurance of a definite degree of conformance to specification requirements with a minimum of expense. Explains how to proceed in sampling attributes. Usefulness of tables in (1) studying experimental data to determine whether the observed variations should be regarded as accidental or significant, (2) planning the kind of experiments from which such data arise, (3) laying out inspection routine, (4) control of manufacturing processes, and (5) writing rational specifications. Charts. Bibliography. See Bell System Technical Publications, Reprint B-1274.

B17 ———— (July, 1941) 20:255-292

Industrial mathematics. T. C. Fry.

Pages 288-292 are particularly relative to industrial statistics and statisticians. Illustrations of five different types of industrial engineering activity in which statistical theory is, or should be, used. These are: (1) in studying experimental data to determine whether the observed variations should be regarded as accidental or significant, (2) in planning the kind of experiments from which such data arise, (3) in laying out an inspection routine, (4) in the control of manufacturing processes, and (5) in writing rational specifications. Diagrams.

B18 ———— (June, 1942) 21:37-50

Using double sampling inspection in a manufacturing plant. D. B. Keeling and L. E. Cisne.

An excellent article describing a detailed method of procedure in sampling on a "go" and "not go" basis of a special number of articles taken at random from a large group. This method has proved successful in establishing and maintaining one type of sampling—the "Average Outgoing Quality Limit" Double Sampling Plan. Tables of lot sizes and corresponding sample sizes which guarantee a certain degree of protection have been used by the Western Electric Company for approximately fifteen years. Tables and charts. See this journal (January, 1941) 20:1-61 for A. O. Q. L. Doubling Sampling tables. See Bell System Technical Publications, Reprint B-1345.

B19 BELL TELEPHONE QUARTERLY (January, 1927) 6:32-46

Quality of telephone materials. R. L. Jones.

Discusses objectives of inspection engineering in its relation to manufacture. Lists five objects of inspection. Typical quality-control charts are illustrated and briefly explained. Results of quality control in the control of raw materials and finished parts. Diagrams.

B20 BIOMETRIKA (December, 1925) 17:364-387

On the extreme individuals and the range of samples taken from a normal population. L. H. C. Tippett.

A technical, mathematical article with tables of the "probability integral of distribution of largest individual in samples of size n taken from normal population" and "mean range of samples of size n taken from normal population (given in terms of standard deviation)."

B21 ———— (April, 1942) 32:301-308

The probability integral of the range in samples of n observations from a normal population. E. S. Pearson.

A table is presented giving the probability that the range in a sample of n observations is less than a given multiple of the population standard deviation. Use of range in place of standard deviation when dealing with samples containing only a small number of observations. Use of table in setting control-chart limits. Origin of present tables credited to L. H. C. Tippett. Tables and bibliography.

B22 ———— (April, 1942) 32:334-338

The range in random samples. H. O. Hartley.

A technical, mathematical article on the use of range when standard deviation of parent population is known. Distribution of range in a grouped sample. The mean range in a grouped sample. The probability integral of the range in random samples; the probability integral of the range in samples from a normal population; the range in randomly grouped samples.

B23 ———— (April, 1943) 33:89-99

Tables of the probability integral of the studentized range. E. S. Pearson and H. O. Hartley.

Examples of applications are given for control of accuracy in chemical routine analysis, control charts for range, and a special problem of "spread" in machine part assembly. Use of range when standard deviation of parent population is not known.

B24 ———— (August, 1944) 33:163-172

The control of industrial processes subject to trends in quality. L. H. C. Tippett.

Discussion of the problem of how to tell when to discard a tool, this being one of the possible measures taken in control of quality of manufactured product. Tables and charts.

B25 BOARD OF TRADE JOURNAL (London), (May 2, 1942) 148:234

The use of quality control charts.

Reference made to the joint meeting of the Institutions of Civil, Mechanical, and Electrical Engineers held in London on April 15, 1942; also to British Standards Institution manuals B. S. 600R and B. S. 1008. A study of either or both of these standards is recommended to all production engineers by the Regional Boards of the Ministry of Production.

B26 BRICK AND CLAY RECORD (February, 1945) 106:39-41

A new way of controlling the quality of your product. J. Manuele.

Article by same title in *Ceramic Industry* (November, 1944) 43:47-49.

B27 BUSINESS WEEK (October 21, 1944) No. 790:60

Figures improve; sound statistical principles to upgrade quality of plant products; War Production Board trains factory men at colleges.

A popular general description of the principles of statistical quality control with a number of instances drawn from business where savings were effected by its use.

C1 CANADIAN INSTITUTE, MINING AND METALLURGY, TRANSACTIONS (1943) 46:184-208

Statistical methods in inspecting materials. H. H. Fairfield.

Reviewed in *Engineering Index* (1943) p. 1003. Steps recommended for improvement of industrial products: make tests and observations during manufacture, record performance of material, study observations and their fluctuation, find correlation between types of observations, apply information so gained. Paper serves merely to introduce subject; those intending to use statistical methods are referred to standard texts. Bibliography.

C2 CANADIAN METALS AND METALLURGICAL INDUSTRIES (July, 1942) 5:194-200

Statistical methods as aid to control of foundry operations. H. H. Fairfield.

Reviewed in *Engineering Index* (1942) p. 583. Although there are certain well-established and widely-used principles of gray iron casting, each foundry is forced to adopt slightly different practices; steps which must be taken to correct causes of occurrence of scrap castings; statistical methods obtain information from operating records; general characteristics of "quality level" process of control; statistical quality-control charts; correlation of mechanical factors. Bibliography. See American Foundrymen's Association, Transactions (December, 1942) 50:611-636.

C3 ———— (August, September, 1944) 7:39-40, 37-40

Quality control in high duty iron production. E. W. Harding.

Reviewed in *Engineering Index* (1944) p. 559. Discussion confined to metallurgical control; quality standards; metal properties as quality characteristics; sampling procedure; importance of ensuring constancy in casting performance emphasized. See also *Foundry Trade Journal* (March 16, March 23, March 30, April 6, 1944) 72:219-233, 239-242, 265-270, 294-298.

C4 ———— (April, 1945) 8:37-40

Maintaining quality of small arms ammunition. M. R. Wilson.

Not available for review.

C5 ———— (August, 1945) 8:32-36

New management method for industrial processes: reducing defective material and inspection time by statistical quality control. H. H. Fairfield.

Not available for review.

C6 CERAMIC INDUSTRY (November, 1944) 43:47-49

New way of controlling the quality of your product. J. Manuele.

Brief discussion of the use of quality control charts and frequency distribution charts; specification limits; standard deviation; control limits. Illustrates quality-control charts. Explains that Westinghouse has been able to control quality without statistical methods. Article by the same title in *Brick and Clay Record* (February, 1945) 106:39-41.

C7 CHEMICAL AND METALLURGICAL ENGINEERING (May, 1929) 36:292-293

Errors of sampling and measurement rationalized by control. A. E. R. Westman.

Short article presenting and explaining the use of two charts for solving systematically the problems involving errors of sampling and measurement which arise in connection with engineering tests. Gives examples to explain the use of the two charts presented.

C8 ———— (March, 1944) 51:117

Nomograph for analyzing percentage tolerances. W. E. Patte.

Explanation of an accompanying nomograph for determining whether production is poorer than a specified standard. Percentage defective in a sample of size *n* is checked to see if production is significantly poorer than standard quality.

C9 ———— (August, 1945) 52:104-106

Process economic analysis aided by new graphic method. M. M. Reynolds.

Not available for review.

C10 CHEMISTRY AND INDUSTRY (December 9, 1944) 49:418-421

Statistical control of accuracy in routine analysis. H. G. MacColl.

Methods used in the British Aluminum Co., Ltd., illustrated with accuracy-control charts showing warning points and action points. Discusses error distribution relationship, precision of the method, accuracy of the method, the control of routine analyses, and tolerances. Charts and tables.

C11 ———— (January 13, 1945) 14:11-12

Methods of sampling of foodstuffs from analysis. J. King, *et al.*

Not available for review.

C12 ———— (April 7, 1945) 14:106-109

Statistical methods in deciding the efficacy of a modification in technical procedure: the use of the T-test to chemists and engineers. U. R. Evans.

Not available for review.

C13 COMMONWEALTH ENGINEER (December 1, 1942) 30:108-109

Quality control; a new industrial technique. F. Gill.

Part of the discussion before the joint meeting of the Institutions of Civil, Mechanical, and Electrical Engineers held in London, April 15, 1942. Not available for review.

D1 DIE CASTING (March, 1944) 2:28-29

Laboratory control in production. B. R. Kashin.

Not available for review.

D2 ———— (September, 1944) 2:64

Inspection methods for quality control.

Not available for review.

D3 ———— (September, 1945) 3:63-64

Statistical method lowers inspection costs. G. B. Harris.

Not available for review.

D4 DUN'S REVIEW (July, 1941) 49:40

Quality control.

A brief note stating that a method for controlling the quality of manufactured products had been approved as an American Defense Emergency Standard.

E1 ECONOMETRICA (January, 1933) 1:23-35

The role of statistical method in economic standardization. Walter A. Shewhart.

Abstract of a lecture presented at the University of London, May, 1932. Discussion of the problem of obtaining statistical stability and need for statistical analysis of variability in product.

E2 ECONOMIST (January 1, 1944) 146:21

Statisticians enter the factory.

A one-paragraph article relative to the introduction of quality control by statistical methods and reporting the publication by British Ministry of Supply of a handbook called *A First Guide to Quality Control for Engineers.*

E3 ELECTRICAL ENGINEERING (September, 1942) 61:449-452

Quality control and the war; experience of U. S. Army Ordnance Department in applying quality control in production of munitions. Leslie E. Simon.

Experience has shown the great value of the techniques of statistical quality control. A summary of quality-control activities in the Ordnance Department.

E4 ———— (July, 1944) 63:525-529

Aids of quality control in the manufacture of aircraft generators. F. M. Potter.

An illustrated article enumerating and describing factors affecting output characteristics and variations that occur in different processes of electrical manufacture.

E5 ———— (November, 1944) 63:405

The application of statistics to dielectrics. Keith E. Ross and C. M. Summers.

A discussion of how statistics can aid the engineer in (1) establishing a specification for a material which adequately defines its characteristics; (2) formulating a method of evaluating the material to assure both supplier and user that the material meets the specifications; and (3) translating the material specifications into design practice. Diagrams and tables. See American Institute of Electrical Engineers, technical paper, May, 1944. See *Beama Journal* (March, 1945) 52:102.

E6 ———— (May, 1945) 64:181-182

Statistical methods in quality control—I. Variability of quality—frequency distributions. A.I.E.E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Deals with the use of frequency distributions in the regulation and control of variability of quality. What the frequency distribution reflects as to the articles tested, the lot from which sample was drawn, and the process of production at time represented by this sample. First of a series of articles.

E7 ———— (July, 1945) 64:249-250

Statistical methods in quality control—II. Two kinds of measurement—variables and attributes. A.I.E.E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Discusses the difference between measurement by variables and measurement by attributes and the use of the arithmetic mean and the standard deviation in solving engineering problems. Shows that although the method of attributes gives lower time necessary for testing, lower skill necessary for testing, lower cost of testing equipment, and lower amount and complexity of records, it also gives less information per observation. Second of a series of articles. Figure and table.

E8 ———— (July, 1945) 64:495-498

Statistical methods applied to insulator development and manufacture. J. J. Taylor.

Examples are given of problems that relate to high-voltage-insulator manufacture and for which statistical treatment seems desirable. Statistical distributions; control of product quality; quality control in relation to routine tests; estimating and predicting from statistical data; correlation of product characteristics; use of quality-control chart. Ten diagrams and one table.

E9 ———— (July, 1945) 64:524-528

Statistical tools for controlling quality. J. Manuele and Casper Goffman.

Shows how to set limits for range and average in the use of quality-control charts and gives argument for use of individual observation charts. Shows how to apply analysis of variance to uncover the existence of assignable causes of variation in a product where several machines perform the same operation. Clearly worked-out illustrations. Charts, diagrams, tables.

E10 ———— (August, 1945) 64:299

Statistical methods in quality control—III. Frequency distribution for setup check of process. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Describes the quickest method for checking parts within desired quality range; the various operations of the inspector; the purpose of the obtainable data. Sample of from 50 to 100 advocated at installation of method if possible. Third of a series of articles. Diagrams.

E11 ———— (August, 1945) 64:573-575

Application of quality control to resistance welding. L. S. Hobson, R. S. Inglis, R. P. McCants.

This paper describes a system of quality control of resistance welding that has been used successfully for the past few years in manufacturing switchgear cubicles and equipment by the General Electric Co., Philadelphia. Standard samples of material identical with production parts are periodically inserted in the welding machine and welded without disturbing the settings and then tested to destruction in a torsion device. The diameter,

torque, and angle of twist at failure all are measured and combined into a single figure indicative of weld quality. This number is plotted on control chart and corrective action is taken whenever the control limits are exceeded. By setting these limits well within allowable values the quality of production parts is assured. Provides a simple, quick, and effective control method. Diagrams and illustrations.

E12 ———— (September, 1945) 64:328-329

Statistical methods in quality control—IV. Subgrouping of data—finding causes of trouble. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Discusses analysis of raw materials, machines, and men as the three basic causes of variations in processing, and makes a recommendation for subgrouping of inspection and test data. Fourth of a series of articles. Charts.

E13 ———— (September, 1945) 64:607-609

Statistics as an aid to engineering judgment in the manufacture of lightning-arrester blocks. Casper Goffman.

Explains production procedure, testing procedure, and correlation between two tests. The use of the t-test is described by means of examples worked out. Diagrams and tables.

E14 ———— (October, 1945) 64:363-364

Statistical methods in quality control—V. Variations to be expected in sampling. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Discusses the chance variations to be expected in observed averages, standard deviations, and fraction defective when the quality of a product is measured by samples. Fifth of a series of articles.

E15 ———— (October, 1945) 64:700-702

Statistical methods in the development of apparatus life quality. Enoch B. Ferrell.

Explains how life tests on a new design of relay were planned so that the methods of statistical quality control could be used to separate assignable causes for variation from random causes for variation during life. Use of statistical quality-control charts is illustrated. How predictions of useful life were made from study of the number of points within the control limits of the charts. Describes simplified methods used in recording and analyzing the data and in establishing trends. Diagrams and tables.

E16 ———— (November, 1945) 64:401-402

Statistical methods in quality control—VI. Charts for Go- and No-go inspection. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

A method for analyzing the results of "go" and "not go" inspection in order to judge whether or not the best results are being obtained on a given job. The sixth of a series of articles. Chart and table.

E17 ———— (December, 1945) 64:448-460

Statistical methods in quality control—VII. Control charts for analysis of variables. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Discussion of control charts and their use of analysis to determine possible factors which might need correction. Describes charts for ranges and for averages. Seventh of a series of articles. Diagram and tables.

E18 ———— (January, 1946) 65:11-12

Statistical control through product testing. P. L. Alger.

How industry can maintain uniformly high standards of quality in large-scale production through the use of statistical quality-control methods. Steps needed to be taken; control of wearing quality of finished products and some of the technical problems requiring solution.

E19 ———— (January, 1946) 65:23-24

Statistical methods in quality control—VIII. Control charts for action on variables. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Discusses the use of control charts for action when inspection is by the method of variables and the factors for control are averages and ranges. Illustrated by typical application: the cutting of small sleeves from a tubing material where weight is one of the critical characteristics to be controlled. Eighth of a series of articles. Chart and table.

E20 ———— (February, 1946) 65:81-83

Statistical methods in quality control—IX. Acceptance sampling. A. I. E. E. subcommittee on Statistical Methods. J. Manuele, H. F. Dodge, A. I. Peterson, R. E. Wareham.

Acceptance sampling plans used in inspections performed by the method of attributes including single sampling, double sampling, and multiple sampling. Presentation of a number of typical "operating characteristics" of sampling plans; comparison of various plans. Ninth of a series of articles. Diagrams and table.

E21 ELECTRICAL ENGINEERS, INSTITUTION OF, JOURNAL (July, 1940) 87:1-21

Statistics and engineering practice. B. P. Dudding and W. J. Jennett.

An introduction to the general advantages, principles, and practices of statistical quality control indicating the procedure to be developed when applying probability theory to the everyday problems of manufacturing industry. Illustrates use of analysis of variance techniques and quality-control charts. Discussion by various engineers. Charts, tables, and bibliography. For abstract see *Nature* (January 20, 1940) 145:117.

E22 ———— (July, 1940) 87:22-32

Statistical methods and factors of safety: an argument for the revision of existing standards. W. T. O'Dea.

Outmoded methods of asking for empirical allowances to cover unknown degrees of variation should be supplanted by statistical methods of deter-

mining the proper-sized samples to protect against these hazards. The advantages of statistical control over the processes of production and the setting of acceptance levels which may be expected with a reasonable degree of confidence to be related to the actual batch characteristics are summarized. See *Mechanical World* (June 21, 1940) 108:539.

E23 ———— (May, 1942) 89, part 1:25

Quality control.

Features of quality control by statistical method as distinguished from other methods; gives arguments for the use of statistical quality control.

E24 ———— (July, 1942) 89, part 1:303-311

Application of statistical control to the quality of materials and manufactured products.

Abstracts of addresses and discussion at the joint meeting of the Institutions of Civil, Electrical, and Mechanical Engineers held in London, April 15, 1942. Details of general introduction by Sir Charles G. Darwin, and a popular exposition of the application of quality control by Sir Frank Gill. Illustration of a simple quality-control system as actually applied in a factory, taken from L. E. Simon's book, *An Engineer's Manual of Statistical Methods*. Discussion by officials of industry and government.

E25 ———— (December, 1943) 90:181-192

A tentative statistical study of domestic radio interference. S. Whitehead.

A technical study relating to the control of radio interference as specified in B.S. 800 *Permissible limits of radio interference*. An estimate is attempted of the probable reduction in the interference due to domestic sources which might be expected if B.S. 800 were applied. Four illustrations of the use of quality-control charts are shown at page 187 with discussion of methods of control and sampling.

E26 ———— (June, 1945) 92, part 2:194-213

The fixing of confidence limits to measurements. H. J. Josephs.

Discusses the problems involved in the application of simple tests of significance to small sets of measurements. Describes the w-test, designed to apply to normally distributed variables, the t-test, which is of particular use in dealing with a small number of observations; explains the use of extreme-mean or median in place of arithmetic mean under certain conditions; Pearson's Chi-square test of goodness of fit. Discussion on pages 206 to 213. Charts and tables. See review in *Electrical Review* (February, 1945) 136:167-168.

E27 ELECTRICAL MANUFACTURING (August, 1944) 34:112-113

Laboratory control insures product quality. J. H. Goss.

Reviewed in *Engineering Index* (1944) p. 333. A system is described for checking upon quality trends of finished apparatus; general scheme is to supplement normal inspection of finished product by system of sample checking and life testing carried out by works laboratory independently of regular production organization. Laboratory control of product quality has been applied to such production as instruments, meters, electronic devices, and measuring apparatus.

E28 ———— (June, 1945) 35:148

Quality control methods for radio tubes.

Not available for review.

E29 ELECTRICAL REVIEW (April 17, 1942) 130:497-498

Institution proceedings—statistical control of quality.

A short article with reference to the joint meeting held in London, April 15, 1942, under the joint sponsorship of the Institutions of Civil, Electrical, and Mechanical Engineers. Gives a general statement of the subject of the meeting.

E30 ———— (February 26, 1943) 132:283-285

Quality control—its application to production engineering. H. Rissik.

Presents a background of quality control and explains what the quality-control chart is. Cites the development of interest in statistical quality control in England since the joint meeting of the Institutions of Civil, Electrical, and Mechanical Engineers in London, April 15, 1942. Details proceedings of the Industrial Applications Group of the Royal Statistical Society.

E31 ———— (March 5, 1943) 132:307-308

Avoiding waste; applications of quality control methods.

A short statement of the new interest in quality control and the ease of its introduction.

E32 ———— (June 4, 1943) 132:743-745

Statistical methods; practical application in the factory. A. S. Wharton.

Practical application of statistical control of quality in factory operations illustrating use of control charts. Applications of the system in the Philips Lamps Ltd. factory. Shows how to control rejections in "go" and "not go" sampling inspection for more than one dimension, and test of practicabiliy of design tolerances. Defends the amount of paperwork necessary in these methods. Charts.

E33 ———— (October 22, 1943) 133:536-538

Bonus on quality. A. S. Wharton.

Schemes for better quality of production are encouraged not only for war but in the competitive markets of peacetime. Shows how to set up comparative performance charts with action and warning limits and explains the meaning of these charts. Charts.

E34 ———— (January 21, 1944) 134:76

Quality control; the human factor. D. Williams.

Importance of the operator's attitude toward quality control for the successful operation of the method. Discusses the care that is required on installation of a quality-control system and points out the sensitiveness of operators to the charts used especially when they advertise poor performance.

E35 ———— (April 28, 1944) 134:589-592

Consumer sampling; applying statistical theory to domestic supplies. G. O. McLean.

Explains how to analyze frequency distributions using various measures of central tendency and variability. Charts and tables.

E36 ———— (June 2, 1944) 134:770

Quality control; application in a department. D. Williams.

A concise article explaining how to go about setting up statistical quality control in a department of a plant.

E37 ———— (February, 1945) 136:167-168

Experimental results; fixing of confidence limits to measurements (abstract and discussion). H. J. Josephs.

See *Electrical Engineers, Institution of—Journal* (June, 1945) 92, part 2: 194-213.

E38 ELECTRICAL TIMES (April 23, 1942) 101:949-951

Quality control in engineering manufacture.

This article deals with the conference jointly sponsored by the Institutions of Civil, Electrical, and Mechanical Engineers, held in London on April 15, 1942. For details of this meeting see *Electrical Engineers, Institution of —Journal* (July, 1942) 89, part 1:303-311. Full report in *Mechanical Engineers, Institution, Journal and Proceedings* (June, 1942) 147:125-144.

E39 ———— (July 30, 1942) 102:152-155

Sampling, inspection, and quality control. H. Rissik.

Deals with the Dodge-Romig sampling inspection plan and sampling inspection for quality control.

E40 ELECTRIC COMMUNICATIONS (October, 1940) 19:127-138

Statistical control of quality of telephone service. W. F. Newland and E. E. Neal.

Describes methods of sampling and analyzing data for control of telephone service quality used by the British Post Office. Tables and charts. See *Royal Statistical Society, Journal* (1939 sup.) 6:25-41, discussion 41-50. See *Engineering* (British), (February 3, 1939) 147:136 for abstract.

E41 ———— (1944) 22:3-10

Refined quality control speeds up production. J. Gaillard.

Reviewed in *Bulletin of Science Abstracts* (Electrical Engineering Section), (February, 1945) 48:26. A concise explanation of what constitutes control of quality in manufacture; the concept and measurement of collective quality; meaning of statistical measure of dispersion in quality; preparation and use of quality-control charts. Typical control chart is discussed with special reference to the distinction between control and specification limits, the initial selection and subsequent revision of control limits, and the utility of control charts in discriminating between variations which are and those which are not due to assignable causes. Draws attention to value of quality control in improving customer relations and in obtaining best results from available manufacturing equipment.

E42 ELECTRICIAN (March 27, 1942) 128:276-280

Quality control in manufacture. H. Rissik.

Covers developments since an earlier article on this subject. Demonstrates how to use control chart in a practical application dealing with a process stability test. Relation between control limits and engineering limits. Quality control as an aid to production. Charts. See *Beama Journal* (June, 1942) 49:163-167. See *Nature* (April 11, 1942) 149:408 for abstract and (May 16, 1942) 149:555 for criticism.

E43 ———— (April 24, 1942) 128:383-384

A useful conference.

Short article referring to the quality-control conference held the previous week in London sponsored jointly by the Institutions of Civil, Electrical, and Mechanical Engineers. Criticizes the government for not having more individuals interested in taking part in the proceedings.

E44 ———— (April 24, 1942) 128:388-393

Application of statistical control to the quality of materials and manufactured products.

Summary of joint meeting held April 15, 1942, in London by the Institutions of Civil, Electrical, and Mechanical Engineers. Explanation of quality control by Sir Charles G. Darwin and Sir Frank Gill. Discussion by B. P. Dudding. Remarks of government and industry officials.

E45 ELECTRIC JOURNAL (March, 1933) 30:110-112

Statistics—informative curves from prosaic figures. Dean Harvey.

Elements of statistics with reference to normal curve of error showing how to calculate arithmetic mean and standard deviation. Of use to those beginning the study of statistical quality control.

E46 ———— (March, 1933) 30:122

Statistical analysis.

An editorial introducing an article on this modern and valuable method of analyzing data.

E47 ———— (April, 1933) 30:147-150

Quality control of a product made possible by analysis of test data. D. Harvey.

With modern statistical methods economic quality of manufactured product can be analyzed and production made within limits which will assist in guaranteeing uniformity of quality. Discussion of the meaning of control; meaning of sampling; explanation by examples and quality-control charts. Deals with the application of statistical quality-control methods and interpretation of data. A general summary of methods is given. Charts and bibliography.

E48 ELECTROCHEMICAL SOCIETY, TRANSACTIONS (1942) 81:377-390

Use of statistical control in corrosion and contact resistance studies. W. E. Campbell.

Explains through examples, tables, and charts the application and use of the quality-control chart and the run chart.

E49 ELECTRONIC INDUSTRIES (May, 1945) 4:84-85

Meeting specifications in U. H. F. H. Gregory Shea.

Describes functional organization of a quality-control department with reference to an organization chart showing Incoming Inspection section, Production Inspection section, Test Equipment section, and Machine and Metal Shop section with details in each of these divisions. Describes details of the various types of electrical and mechanical testing required and the place occupied by statistical quality-control charts—one of which is illustrated but not explained in detail. Diagrams.

E50 ELECTRONICS (January, 1945) 18:122-125

Quality control in tube manufacture. Eugene Goddess.

A short popular-style article discussing problems involved in setting up a statistical method of quality control of tubes and component parts during manufacture with instructions for using process-control charts in connection with random-sampling techniques to detect promptly when a process is out of control and causing excessive shrinkage.

E51 ENGINEER (November 29, December 6, 13, 20, 27, 1940) 170: 341-342, 357-359, 372-373, 389-390, 404-406

Statistical methods in engineering practice. H. Rissik.

An excellent series of articles. (1) The fundamental aspects of statistical technique. Scope of statistics in engineering practice; use of probability in engineering. Quality control as an emergency concept. (2-3) Discussion of quality control in production engineering. Quality control as a unity of theory and practice. Theoretical principles underlying the quality-control chart. Use of the control chart explained. Illustration from B.S. 600-1935 by E. S. Pearson. (4) Deals with quality standards in purchasing specifications. Discrimination between satisfactory and unsatisfactory quality. (5) Discussion of sampling inspection in the control and standardization of quality. The statistics of random sampling. Sampling inspection for consumer protection. Sampling inspection in quantity production. Charts, tables, bibliography.

E52 ———— (October 24, 31, 1941) 172:276-278, 296-298

Probability graph paper and its engineering applications. H. Rissik.

The statistical treatment of quantitative data; description of characteristics of a frequency distribution. First article has mathematical development of the mean and standard deviation. Second article presents quality-control charts and method of their use. The use of probability paper in determining the distribution of parameters and mean and standard deviation is explained. Charts and tables.

E53 ———— (January 30, 1942) 173:100-102; editorial discussion p. 98

The technique of quality control.

Gives a practical example of a quality-control system from Appendix C, *An Engineer's Manual of Statistical Methods* by L. E. Simon, as an illustration of the simplicity to which the administration of statistical methods can be reduced in practice. Compares statistical quality control to a slide rule as a scientific instrument. Charts and tables.

E54 ———— (March 27, 1942) 173:266-267

Statistical control of quality.

Notice concerning a joint meeting to be held in London, April 15, 1942, by the Institutions of Civil, Electrical, and Mechanical Engineers, to discuss "The Application of Statistical Control of the Quality of Materials and Manufactured Products." Short abstracts are given of the introductory remarks of Sir C. G. Darwin and an exposition of the application of quality control by Sir Frank Gill. Calls on factory engineers to begin at once to study the rules for the application of quality control and not to wait to study the statistical foundation. First steps are listed. Need of quality-control introduction in wartime is stated. See full report in *Mechanical Engineers, Institution of, Journal and Proceedings* (June, 1942) 147:125-144.

E55 ———— (April 24, 1942) 173:348

Quality control.

Summarizes the jointly sponsored meeting of the Institutions of Civil, Electrical, and Mechanical Engineers, held in London, April 15, 1942.

E56 ———— (April 24, May 1, 1942) 173:346-347, 374-376

Statistical quality control.

A rather complete review and discussion of quality control as presented at the London meeting of the Institutions of Civil, Electrical, and Mechanical Engineers, April 15, 1942. General introduction by Sir C. G. Darwin, and popular exposition of the application of quality control by Sir Frank Gill. Discussion by various executives of government and industry. Constant reference is made to British Standards 600 and 1008. Complete report in *Mechanical Engineers, Institution of, Journal and Proceedings* (June, 1942) 147:125-144.

E57 ———— (May 1, 1942) 173:370

Quality control. Letter to editor from M. I., Mech. E.

Criticizes the enthusiasm for quality control by statistical methods and gives general criticisms of the system. Suggests that control charts can be faked by replotting the results of previous inspection findings; quality control is not applicable where 100 per cent inspection of product is called for; criticizes the amount of chart-making necessary for complete control. See reply by H. Rissik, this journal (May 8, 1942) 173:389.

E58 ———— (May 8, 1942) 173:389

Quality control.

Letter to editor by H. Rissik replying to and refuting criticism of M. I., Mech. E., in letter to this journal (May 1, 1942) 173:370.

E59 ———— (June 26, 1942) 173:528-529

Sampling and probability. R. H. Parsons.

Discussion of probability theory in estimating quality of lot from that of the sample; the probability of the good articles in the bulk constituting not less than a given percentage of the total. These relationships are shown by a table. Charts and tables.

E60 ———— (July 24, 31; August 7, 1942) 174:64-65, 86-89, 106-108

Model quality control charts. H. Rissik

A relatively simple method is illustrated for making hypothetical examples of "controlled" production processes, which can be converted into simulated "uncontrolled" conditions of operation. Experimental models illustrating statistical quality-control techniques with a direct appeal to practical minds. Practical instruction in quality-control technique is given. The statistical control of product quality is discussed. Six essential characteristics of the statistical approach are outlined. Tippett's random-sampling numbers are discussed as well as control-chart analysis of production data and analysis by rational subgroupings. Charts and tables.

E61 ———— (August 28, 1942) 174:173

Book review of *An Engineer's Manual of Statistical Methods* by Leslie E. Simon.

E62 ———— (September 4, 1942) 174:195-196

Reviews of British Standards No. 1008—*Quality Control* and No. 600R—*Quality Control Charts.*

B.S. 1008-1942 is a reproduction of American Defense Emergency Standards Z1.1-1941—*Guide for Quality Control* and Z1.2-1941—*Control Chart Method of Analyzing Data,* published by the American Standards Association. B.S. 600R-1942 is the first part of a much needed revision of B.S. 600-1935—*The Application of Statistical Methods to Industrial Standardization and Quality Control.*

E63 ———— (April 23, 30, 1943) 175:334-335, 346-347

Quality assurance through sampling inspection. H. Rissik.

Importance of quality control; technique of statistical method of control; principles of statistical quality control; application of the method. Explanation of A.O.Q.L. Double Sampling Inspection by use of Dodge-Romig tables. Based in part on an address before the Institution of Engineering Inspection and the Works Management Association, London, April 15, 1943. Charts and table.

E64 ———— (December 24, 1943) 176:507-508

Quality control.

Summary of symposium held by the Institution of Mechanical Engineers. Papers were: "Inspection Efficiency" by J. C. Edwards and W. A. Bennett; "The Application of Statistical Methods to the Control of Industrial Costs" by N. R. Neal; and "Sampling Schemes for Qualitative Inspection" by A. W. Swan.

E65 ———— (June 23, 1944) 177:481-483

Efficient use of gauges in quality control. L. H. C. Tippett.

Discusses control of average by a single gauge, and control of average and variability by two gauges. The reader is assumed to be acquainted with the ordinary methods and language of quality control by statistical methods. Charts.

E66 ———— (July 14, 1944) 178:26-27

A model for quantitative statistical experiments. F. C. Turner.

Reviewed in *Engineering Index* (1944) pages 990-991. Illustrated description of model developed by author to rapidly furnish representative data, allowing that data to be varied to simulate, for example, production processes, and give at the same time visual proof of conclusions, example being given of quality control in production; basic principle adopted is dropping of spherical specimens through V-shaped slot into contiguous compartments; many instructive experiments are possible.

E67 ENGINEERING (March 9, 1934) 137:288

The Society of Glass Technology.

Abstract of paper "The Application of Statistical Methods to the Quality Control of Manufactured Products: the Planning of Statistical Tests" by B. P. Dudding and I. M. Baker, presented before the above society. A short article. See *Society of Glass Technology, Journal* (September, 1933) 17:239-250 for complete address. See *Society of Chemical Industry, Journal* (March 3, 1933) 52:185 for abstract.

E68 ———— (February 3, 1939) 147:136

Statistical control of telephone service.

Abstract of paper "Statistical Control of the Quality of Telephone Service" by W. F. Newland and E. E. Neal, presented before the Industrial and Agricultural Research Section of the Royal Statistical Society. Basic considerations in establishing control are discussed. Charts. See *Royal Statistical Society, Journal* (supplement 1939) 6:25-41, discussion 41-50. See *Electric Communications* (October, 1940) 19:127-138.

E69 ———— (April 24, 1942) 153:332-333

Statistical control of repetition work.

Editorial discussing the practicability of working to ranges of variation well within specification limits; the underlying principles of statistical methods; limitations in practice; and refers to joint meeting of Institutions of Civil, Electrical, and Mechanical Engineers held in London, April 15, 1942.

E70 ———— (May 29, 1942) 153:433-434

Letter to the editor regarding statistical control in repetition work. B. P. Dudding and W. J. Jennett.

Authors commend editorial of April 24, 1942, but call attention to aspects of the use of statistical methods as aids to production efficiency to offset the effect of some of the statements made.

E71 ———— (October 9, 1942) 154:294-295

Size of samples. R. H. Parsons.

Explains by means of tables and formulae why a small sample is over-optimistic of the quality of a batch and how to determine the size of sample necessary in order that there may be any assigned odds in favor of the sample affording evidence of the bulk falling below some specified standard of quality. See letter to editor, this journal (November 13, 1942) 154:395.

E72 ———— (November 13, 1942) 154:395

Letter to editor by R. H. Parsons in answer to criticism regarding article on "Size of Samples" in this journal (October 9, 1942) 154:294-295. Defends statement that only a few minutes were needed for calculations. Gives tables of sample sizes necessary for even odds and ten to one odds that the presence of more than certain specified percentages of bad articles in batches of different sizes will be detected.

E73 ———— (January 26, 1945) 159:63

Book review of *Sampling Inspection Tables* by H. F. Dodge and H. G. Romig.

E74 ———— (June 1, 1945) 159:422-423

Quality through statistics.

Book review of *Quality through Statistics* by A. S. Wharton of Philips Lamps, Ltd. This is an introduction to the statistical approach to inspection problems. Explains a multiple-sampling scheme developed by the author as a simpler and more easily understood substitute for inspection procedure for general use by goods-receiving departments than the Dodge-Romig A.O.Q.L. sampling inspection tables. Illustrates control chart. Applications successfully pioneered by the author are: quality bonus incentive schemes, departmental performance summaries, budgetary control of scrap and reprocessing work, and quality grading of production. See letter from V. E. Gough, this journal (June 29, 1945) 159:514, criticizing reviewer.

E75 ———— (June 29, 1945) 159:514

Quality through statistics.

Letter to editor from V. E. Gough criticizing reviewer of book by A. S. Wharton, this journal (June 1, 1945) 159:422-423, for statement relative to excellence of illustration and use of control chart in the book. Criticizes the book for apparent misstatements regarding control limits which appear to be subjectively arrived at rather than objectively from adequate observational data. See answer to this letter (July 6, 1945) 160:14.

E76 ———— (July 6, 1945) 160:14

Quality through statistics.

Letter to editor from reviewer of book by A. S. Wharton answering criticism of V. E. Gough, this journal (June 29, 1945) 159:514. Holds that Gough's attitude is narrow in maintaining that quality-control charts cannot serve their proper purpose "unless the control limits are computed from the observed data." This is not the essence of the statistical method as a scientific approach to the control of quality of manufactured products. States that Mr. Wharton is on perfectly sound ground when he fixes a "control standard" for percentage defective which is derived from economic considerations. The control chart should be thought of as an instrument of practical control rather than a means of statistical prediction. See reply to this letter by V. E. Gough (August 3, 1945) 160:94.

E77 ———— (August 3, 1945) 160:94

Quality through statistics.

Reply to reviewer of book by A. S. Wharton by reader V. E. Gough maintaining his original point of the necessity of determining the control limits

of the control chart from observable data. See letter to editor this journal (August 24, 1945) 160:154.

E78 ———— (August 24, 1945) 160:154

Quality through statistics.

Letter to editor by C. G. A. Hall referring to letters by V. E. Gough in connection with book by A. S. Wharton. Holds that Gough's methods are demonstrated as being mainly theoretical. Economic considerations cannot be overlooked and practical results are what count. The control should be fixed according to the percentage that can be accepted at further assembly or production states and not simply according to past data (although these must be considered).

E79 ENGINEERING EDUCATION, JOURNAL (December, 1941) 32:328-334

Statistical basis of the quality control program. S. S. Wilks.

A brief nontechnical outline of the statistical background of quality-control procedures in use. Points out the need for statistical training of future engineers.

E80 ———— (April, 1942) 32:667-672

Teaching quality control theory to engineers. L. C. Young.

Explains courses given at Massachusetts Institute of Technology. The need for statistically-trained engineers is emphasized. Discusses the two points of view: engineering approach and statistical methods; how they may be brought closer together.

E81 ———— (March, 1944) 34:492-494

Quality control, a field for the mathematician. B. Epstein.

A short article explaining what quality control is; work of the mathematician in designing experiments which will uncover reasons for departures from normal state of affairs shown up by quality-control charts. States that as a class industrial engineers do not have sufficient background of mathematics and physics to set up these experiments or to properly interpret the results in the light of known statistical principles.

E82 ENGINEERING INSPECTION, INSTITUTION OF, JOURNAL (Winter, 1942) 7:4-19

Statistical control of quality in production engineering. R. Royan and H. Rissik.

Reviewed in *Engineering Index* (1942) page 1031. Gives an account of quality control; its advantages; inspection as a basis of quality control; confidence between manufacturer and buyer; principles of quality control; quality control in practice.

E83 ———— (Spring, 1943) 8:29-36

Brief summary of some simple methods of quality control. A. S. Wharton.

Reviewed in *Engineering Index* (1943) page 846. Quality control is considered an easy means of demonstrating to the technician where his problem lies, thus enabling production improvement; quality control forms a modern basis for reorganization of inspection.

E84 ———— (Summer, 1943) 8:12-29

Quality control in production engineering. H. Rissik.

Reviewed in *Engineering Index* (1943) page 1003. Importance of quality control; techniques using statistical methods; principles and application.

E85 ———— (Summer, 1943) 8:29-33

Quality control procedures in ordnance inspection. G. D. Edwards.

Reviewed in *Engineering Index* (1943) page 750. Part which quality-control techniques have in procedures involved in securing adequate quality of material before accepting it for use by fighting forces; perfection in mass production; inspection-fatigue quality risks in mass production; proper use of quality-control procedures; encouraging manufacturers to control quality; decentralizing introduction of control procedures. See *Mechanical Engineering* (September, 1942) 64:673-675.

E86 ———— (Autumn, 1943) 8:16

The recording of results of multi-dimensional inspection in connection with quality control. W. A. Bennett and J. W. Rodgers.

Not available for review.

E87 ———— (Winter, 1943) 8:12-21

Inspection efficiency. W. A. Bennett and J. C. Edwards.

Reviewed in *Engineering Index* (1944) page 545. Steps taken to improve inspection efficiency by firm engaged on mass production of small-metal components made on automatic machines, capstan lathes, presses, and special-purpose machines. See *Machinery* (British) (January 13, 1944) 64:42-43.

E88 ———— (Winter, 1943) 8:42

Quality control.

Not available for review.

E89 ———— (Spring, 1944) 9:6-18

The industrial application of mechanical engineering inspection. D. P. Muirhead.

Not available for review.

E90 ———— (Summer, 1944) 9:5

Control in the manufacture of low voltage coils and bobbins. C. M. Young.

Not available for review.

E91 ———— (Summer, 1944) 9:6-8

Engineering inspection. S. Cripps.

Not available for review.

E92 ———— (Summer, 1944) 9:23-30

The making of high duty iron casting to specifications. E. Hunter.

Not available for review.

E93 ———— (Summer, 1944) 9:30-35

Recent developments in inspection methods. H. H. Jackson.

Not available for review.

E94 ———— (Winter, 1944) 10:4-8

Statistical methods and the functions of inspection in manufacturing industry. B. P. Dudding.

Not available for review.

E95 ———— (Winter, 1944) 10:39-40

Postwar control of quality of commercial products. J. W. Baker.

Not available for review.

E96 ———— (Spring, 1945) 10:4-16

Significance of accurate fine measurement in the statistical prediction of quality in engineering component manufacture. H. Howell.

Not available for review.

E97 ———— (Spring, 1945) 10:36-39

Quality control. E. Lott.

Not available for review.

E98 ———— (Spring, 1945) 10:39

Comment on postwar quality control of commercial products. R. Royan.

Not available for review.

E99 ENGINEERING JOURNAL, ENGINEERING INSTITUTE OF CANADA (January, 1943) 26:11-17

War production problems—the statistical control of quality.

Presents "General Introduction" by Sir C. G. Darwin, and "Popular Exposition of the Application of Quality Control" by Sir Frank Gill. These two papers were delivered before the joint meeting of the Institutions of Civil, Electrical, and Mechanical Engineers, held in London, April 15, 1942.

E100 ———— (July, 1943) 26:398-403

Statistical control of quality.

Proceedings of the annual meeting of the Engineering Institute of Canada, Toronto, February 12, 1943, including "Application of Statistical Inspection in the Telephone Industry" by H. H. Vroom, and "Statistical Methods in Forestry" by T. W. Dwight, together with discussion of the papers. Various members called attention to uses and benefits of quality-control techniques. Chart and table.

E101 ———— (September, 1943) 26:492-501

Statistical analysis of inspection results. H. H. Fairfield.

A very instructive article explaining statistical methods available for study of inspection and test results. How to improve industrial products by: (1) making tests and observations during manufacture; (2) recording

performance of material; (3) study of observations and their fluctuation; (4) finding correlation between types of observations; and (5) applying information so gained. Charts and tables.

E102 ENGINEERS OF AUSTRALIA, INSTITUTION OF, JOURNAL (March, 1943) 15:53-62

Application of statistical methods to quality control of materials and manufactured products.

The practical applications of sampling and other statistical methods are presented in a symposium by M. H. Belz, E. A. Cornish, and A. L. Stewart. Not available for review.

F1 FACTORY AND INDUSTRIAL MANAGEMENT (September, October, 1928) 76:503-505, 724-726

Quality control by sampling. W. L. Robertson.

Gives illustrations of various sampling plans and describes methods used by Western Electric Company of Chicago. Rule-of-thumb method long accepted by industry gives way to scientific inspection based on mathematics of probabilities. In showing the manner in which sampling method has been practically applied in his own plant, the author points the way to its use for inspection in other fields. Illustrations and tables.

F2 ———— (October, 1929) 78:823-826

The price of absolute quality. E. C. Brueckmann.

Quality control results from uniform raw materials, uniform manufacturing, controlled equipment, and intelligent supervision. Methods used by Westinghouse Lamp Co. for control of quality of products which have no degrees of quality but are either good or bad are explained. Plans are given for carrying out the quality-control program. Illustrations and charts.

F3 FACTORY MANAGEMENT AND MAINTENANCE (June, 1941) 99:57-64

All-out for quality. R. F. Bisbee.

Explains how quality-control department functions at Westinghouse Electric and Manufacturing Co., Mansfield, O. Six thousand individual checks are made on an electric range. Use of vitamin A to improve ability of color-matchers. Savings made through proper packaging are stated. Illustrations.

F4 ———— (April, 1944) 102:96-97

Work simplification halves inspection time. M. L. Hillmer.

Short but forceful article emphasizing the importance of proper sequence of motions in the inspection operation. Nonstatistical. Illustrations.

F5 ———— (January, 1945) 103:121-128

Statistical methods in quality control. C. G. Stephens and J. Rutherford.

A popular description of the technique of statistical quality control using a case study based on bolt shipments and receiving reports over a period of several months at the Glenn L. Martin Co. plant in Baltimore. Explains uses and limitations of sampling by attributes. Explains with diagrams the

meaning of lot quality assurance through sampling, average outgoing quality assurance through sampling, single sampling, and double sampling. Details of how these plans work. States the case problem of bolt inspection and describes the steps taken to assure quality of materials and processed parts. Examples shown of forms used in the inspection, testing, and control phases. The control chart is illustrated and briefly explained. Diagrams and tables.

F6 ———— (September, 1945) 103:116-120

Using the chart method to control quality; Sylvania Electric Products. H. Reinhardt and E. Benson.

Describes the details of a simplified procedure for applying quality-control charts showing per cent defective of a product inspected on a "go" and "no-go" basis. The system has been successfully used in a number of plants. Tables tell how to compute control limits and illustrations of quality-control chart and quality-control board are presented. A practical "how to do it" article.

F7 FOOD INDUSTRIES (December, 1945) 17:1468-1470

Systematic sampling pays in controlling filling weights: use in can-filling weight control: Shewhart charts. H. P. Goode and George I. Dundas.

An explanation in nonstatistical language of a procedure for controlling quality and costs, illustrated with an actual example of its use in can-filling weight control. What the charts show; application to can-fill; advantages of the method. Illustration and chart.

F8 FORESTRY, JOURNAL OF (November, 1928) 26:899-905

Significance of an observed range. Walter A. Shewhart.

A mathematical article illustrated with an example using samples of sizes four, sixteen, and one hundred, and as data the measurements of modulus of rupture in pounds per square inch for poles of several species. Estimate of probability associated with observed range. A probability and range chart is presented. See Bell System Technical Publications (December, 1928), Reprint B-362.

F9 FORTUNE (October, 1943) 28:126-127

Quality control; its demands grow tighter as war gets tougher.

Introduction to the way in which statistical quality control began. Illustrated.

F10 ———— (October, 1943) 28:128-129

To one-millionth of an inch.

A very interesting detailed description of quality control in the SKF Industries, Inc., ball-bearing plant. Application of Shewhart "average" and "dispersion" quality-control charts and the Universal Double Sampling plan plus 200 per cent inspection to obtain precision on the order of one-millionth of an inch in smoothness and roundness, and two-millionths of an inch in size. Illustrations.

F11 FOUNDRY TRADE JOURNAL (March 16, 23, 30, April 6, 1944) 72:219-233, 239-242, 265-270, 294-298

Quality control in high duty iron production. E. W. Harding.

See *Canadian Metals and Metallurgical Industries* (August, September, 1944) 7:39-40, 37-40. See review in *Engineering Index* (1944) page 559.

F12 ———— (September 28, 1944) 74:67-70

Specifications, quality control, and inspection. J. F. Kayser.

Not available for review.

F13 FRANKLIN INSTITUTE, JOURNAL (March, 1928) 205:395-405

Economic aspects of engineering applications of statistical methods. Walter A. Shewhart.

Explains modern application of statistical methods to engineering data in research, development, design, production, inspection, and supply; points out the fact that there are economic advantages to be gained through the use of statistical methods. Bibliography.

F14 ———— (August, 1938) 226:163-186

Application of statistical methods to manufacturing problems. Walter A. Shewhart.

Shows how these methods make possible the highest economic standards of quality. A demonstration and explanation of sampling probability and the application to quality control of manufactured product. Charts.

F15 ———— (July, 1940) 229:816-817

Book review of *Statistical Method from the Viewpoint of Quality Control* by Walter A. Shewhart. Review by R. H. Oppermann. See references to other reviews under title of the book.

F16 ———— (May, 1944) 237:359-370

Industrial lot and its sampling implications. Leslie E. Simon.

Definition of the lot as an aggregation of articles which are essentially alike. Essentials of Shewhart criterion of control; determination of lots. A method of quality determination through sampling is presented. Illustration of use of quality-control charts. Dangers cited in predicting lot quality from small samples. Chart, table, bibliography. See reprint in *American Society of Naval Engineers, Journal* (August, 1944) 56:422-431.

F17 ———— (November, 1944) 238:335-344

The origin of interchangeable parts. Thomas Coulson.

Additional information relating to the question to whom credit can be given for originating the system of interchangeable parts. This article deals with the claim of Simeon North, the first official pistol maker of the United States Government, and that of Eli Whitney, inventor of the cotton gin.

G1 GENERAL ELECTRIC COMPANY JOURNAL (British) (August, 1937) 7:206

Statistical technique as a tool in industry. B. P. Dudding and W. J. Jennett.

Not available for review.

G2 ———— (July, 1940) 11: No. 3

Statistics and engineering practice. B. P. Dudding and W. J. Jennett.

Not available for review. See comment under *Electrical Engineers, Institution of, Journal* (July, 1940) 87:1-21. For other references to this address see *Machinery* (British), (March 21, April 11, 1940) 55:696-701; 56:51-60. Also, *Mechanical World* (May 2, 16, 23, 1941) 109:310-312, 343-344, 361-363.

G3 ———— (February, 1941) 11:195

Statistics and engineering practice.

Not available for review.

G4 ———— (August, 1942) 12:108

Quality control statistics as an aid to production efficiency. B. P. Dudding and W. J. Jennett.

Not available for review.

G5 ———— (August, 1944) 13:60-64

Quality control when manufacturing to specification. B. P. Dudding and W. J. Jennett.

An introduction to the subject; it describes methods that have been evolved to assist engineers in applying quality control to production problems. See Electrical Engineering Abstracts: Section B of *Science Abstracts* (March, 1945) 48:65.

G6 GENERAL ELECTRIC REVIEW (February, 1944) 47:18-19

Progress in engineering knowledge during 1943; quality control. P. L. Alger and J. Stokley.

Very short article advising engineers that statistical quality control has been in existence for twenty years and explaining in a few paragraphs of what it consists basically. Bibliography.

G7 ———— (November, 1944) 47:42-47

Controlling quality of resistance-thermometer bulbs. R. E. Franck.

Outlines the use of laboratory quality-control tests on samples taken periodically from the completed product ready for shipment as a check on the over-all accuracy of the factory measurements. How the quality-control test data are compared with factory test data. Charts and illustrations.

G8 GLASS INDUSTRY (November, 1943) 24:474

Quality control. F. W. Preston.

A short article setting forth reasons why quality control is important in glass manufacture and why, though it cannot eliminate all the troubles of a glass producer, it may be of help in eliminating some of his difficulties.

G9 ———— (August, September, 1944) 25:358-360, 407-408

A.B.C. of quality control. J. M. Juran.

See note under *Mechanical Engineering* (August, 1944) 66:529-535.

G10 ———— (October, 1944) 25:447-449

Discussion on pots and quality control; abstracts of papers of Glass Division autumn meeting.

(1) "Introduction to the Use of Statistical Methods" by F. W. Preston, Preston Laboratories.

(2) "Background, Explanation, and Application of Statistical Control Charts in War Industries" by Dr. H. Working, Office of Production Research and Development.

(3) "A Discussion of the Applicability of Control Charts to Glass Container Production" by J. H. Toulouse, Owens-Illinois Glass Co.

(4) "Practical Control of Quality of Parts Made in Small Lots or Short Runs" by J. Manuele, Westinghouse Electric and Manufacturing Co.

(5) "Application of Control Charts to Daily Glass Density Measurements" by Dr. L. G. Ghering, Preston Laboratories.

(6) "Demonstration of Sampling Fluctuations in Drawings from a Bowl" by J. H. Toulouse.

G11 ———— (October, 1944) 25:450-454

Elementary principles of controlling quality of product during manufacturing. Joseph Manuele.

Explains the use of statistical methods to control quality but calls attention to the fact that Westinghouse was able to control quality without statistics. Statistical method, while desirable, is a rather expensive tool, requiring trained personnel. Also these methods are difficult to explain to people who do not have the proper mathematical background. Fundamentals of the method can be retained if very small samples are used—say, samples of one piece. Then the method revolves itself into "first piece and patrol inspection." Explains this method in a clear manner. Charts, diagrams, illustrations.

G12 ———— (October, 1944) 25:460

Quality control.

An editorial pointing out that interest in quality control is shown by the attendance at symposium on Refined Methods of Quality Control held by the Glass Division of the American Ceramics Society. Recommends certain elementary material for the uninitiated.

H1 HARVARD BUSINESS REVIEW (April, 1942) 20:358-368

Scientific sampling in business. T. H. Brown.

Some of the problems arising in the use of sampling theory in practical market research.

I1 INDUSTRIAL BULLETIN (October, 1945) No. 214:1

The mathematical inspector.

In a short article by the editor of the bulletin of Arthur D. Little, Inc., it is noted that statistical quality control was developed at Bell Telephone Laboratories two decades ago and that in 1940-41 it was put into use in the Cleveland Ordnance District. Cites savings made in inspection salaries.

I2 INDUSTRIAL ENGINEER (February, 1945) 5:19-22

The philosophy of the statistical approach to quality control. O. F. Stewart.

Not available for review.

I3 INDUSTRIAL FINISHING (October, 1943) 19:615-617

Control of quality in our aircraft finishing. W. D. Caldwell.

Not available for review.

I4 ———— (July, 1945) 21:44

Quality control through production records. W. W. Loman.

Not available for review.

I5 INDUSTRIAL POWER AND PRODUCTION (February, 1945) 21:47-48

How quality control can improve batch production. W. J. Roberts.

Not available for review.

I6 INDUSTRIAL QUALITY CONTROL (July, 1944) 1, 1:3

Some axioms of quality control. W. A. Kerr.

Although the quality control set-up of each plant will be in the main unlike that of any other plant, certain well-established principles underlying the basic methods common to all systems appear to be so general as to have the characteristic of being axiomatic. Nine of these axioms are explained.

I7 ———— (July, 1944) 1, 1:4-9

The introduction of quality control at Colonial Radio Corporation. G. V. Herrold.

The steps taken in the development of a system of statistical control are enumerated and illustrated by examples of the problems encountered. Quality control charts are used to clarify the discussion. Charts.

I8 ———— (July, 1944) 1, 1:10-13

New developments in quality control.

Presents diagram and tables for handling various situations involving defectives going into subsequent operations. How to determine whether to use 100 per cent inspection or sampling inspection.

I9 ———— (September, 1944) 1, 2:3-9

Statistical quality control at Bell Aircraft Corporation. J. H. Munger.

Explains why it is difficult to apply statistical quality-control methods to the manufacture of aircraft. Describes the first steps taken to eliminate waste in man-hours and materials through quality-control techniques applied to short-run fabrication processes. Charts.

I10 ———— (September, 1944) 1, 2:10-11

Control charts for non-symmetrical distributions.

The first of two articles explaining how to handle situations when measurements are not distributed symmetrically about their own average. Charts and tables. See this journal (November, 1944) 1, 3:9-12.

I11 ———— (September, 1944) 1, 2:11-13

Table of limits for charts for defects. Vernon Grom.

Presents a table of 3-sigma upper and lower limits to be used in preparing charts for number of defects per unit.

I12 ———— (November, 1944) 1, 3:3-4

Applied quality control. Andrew I. Peterson.

Explains the true meaning of quality control in modern manufacturing. Cites the consequences of lack of control. The advantages of control are set forth. Requirements of a quality-control program and the educational and organizational steps necessary for setting up such a system.

I13 ———— (November, 1944) 1, 3:5-9

Growth of a quality control department in a Canadian ammunition plant. Douglas F. Brown.

Explains problems encountered in setting up a quality-control system in a munitions plant. Describes the place of the quality-control department in the organization and the duties of its members. Examples of problem solutions are given. Diagram.

I14 ———— (November, 1944) 1, 3:9-12

Control charts for non-symmetrical distributions.

The second of two articles explaining how to handle situations when measurements are not distributed symmetrically about their own averages. Charts and tables. See this journal (September, 1944) 1, 2:10-11.

I15 ———— (November, 1944) 1, 3:13-16

A simplified method of computing control limits for per cent defective. H. Reinhardt and E. D. Benson.

Article gives detailed instructions and presents the resultant tables.

I16 ———— (January, 1945) 1, 4:3-5

The quality habit. Harry E. Paddock.

Necessity for development of the quality habit; steps management can take toward this desirable condition; functions of a quality-control department and how cooperation is promoted and maintained with the production department.

I17 ———— (January, 1945) 1, 4:6-9

The analysis of sampling plans in receiving inspection. Martin A. Brumbaugh.

Description of a percentage plan widely used in different industries—specifically: "Take a ten per cent sample. If the sample is not more than two per cent defective, accept the lot." Several points regarding what is to be expected of the plan are discussed. Charts and tables.

I18 ———— (January, 1945) 1,4:12-15

Development of reject limits for measurements. A. J. Winterhalter.

The first of two articles discussing inspection at the point of production and at a point remote from production. Use of frequency distribution and control chart. Advantages in sampling by variables; danger in the method

of sampling by attributes. Information regarding manufacturing process required for sound judgment of quality. Charts, diagrams, tables. See this journal (March, 1945) 1, 5:12-13.

I19 ———— (January, 1945) 1, 4:16-17

Constitution of Society of Quality Control Engineers of Buffalo, N. Y.

I20 ———— (March, 1945) 1, 5:2

Quality control: a tool of management.

Editorial. What quality control by statistical methods can do toward solving problems relating to design, purchase of raw material, machine operations, assembly, marketing, and pricing.

I21 ———— (March, 1945) 1, 5:3-5

Top management views quality control. M. H. Eisenhart.

Address presented at meeting which opened the first quality-control clinic sponsored jointly by the Rochester Quality Control Engineers and the Industrial Management Council of Rochester.

I22 ———— (March, 1945) 1, 5:6-9

Multiple characteristics as related to sampling. Vernon R. Grom.

Discusses the major problem at Curtiss-Wright plant of sampling airplane parts containing several characteristics. Plans in use, objectives of sampling inspection, and attack on plan. Three cases are cited. Diagrams and table.

I23 ———— (March, 1945) 1, 5:12-13

Development of reject limits for measurements. A. J. Winterhalter.

The second of two articles discussing inspection at the point of production and at a point remote from production. Use of frequency distribution and control chart. Advantages in sampling by variables; danger in the method of sampling by attributes pointed out. Information regarding manufacturing process required for sound judgment of quality. See this journal (January, 1945) 1, 4:12-15.

I24 ———— (March, 1945) 1, 5:15-18

Rochester clinic. Abstracts of clinics held February 20, 1945, sponsored by The Quality Control Engineers of Rochester.

(1) Installing a quality-control system.
(2) The function of statistics in process quality control.
(3) Single versus double sampling for acceptance inspection.
(4) Quality control as a cost-reduction instrument.
(5) Application of control charts to screw-thread problems.
(6) Quality control through gauge control.
(7) Recent developments in gauging practice.
(8) Methods of reporting quality performance to management.
(9) Role of inspection in development of new product.

I25 ———— (May, 1945) 1, 6:3-6

Analysis of double sampling plan. J. R. Steen.

Describes with equations a double-sampling plan specified for use of the armed forces for acceptance of certain material. Comments and explanations intended primarily for those who are interested in becoming more familiar with the principle involved. Charts.

I26 ———— (May, 1945) 1, 6:7-10

Control chart for determining tool wear. J. Manuele.

An example is worked out showing how a process involving tool wear can be controlled through use of the proper type of statistical quality-control charts. Charts.

I27 ———— (May, 1945) 1, 6:11-14

A comparison of acceptance inspection plans. Paul Peach.

Comparison is made between single-sampling and double-sampling plans; between Army Ordnance tables and Dodge-Romig tables; then between double sampling and sequential sampling; and a summary of findings.

I28 ———— (May, 1945) 1,6:15-16

Use of a table of areas of the normal curve in quality control work. Martin A. Brumbaugh.

Explains with examples how to use the table of areas to determine the percentage of rework and of scrap. A table of areas is reproduced.

I29 ———— (July, 1945) 2, 1:3-9

Applications of quality control at Bausch and Lomb Optical Company. W. Bidlack, E. R. Close, and J. C. Warren.

Explains some of the results obtained from the application of quality control in the Instrument Division. Quality control of binocular bodies. Problem involving thirteen machine operations and twenty-eight different characteristics in the product where defective results might occur. How the problem was attacked; quality control of miscellaneous parts; frequency distribution analysis illustrated; quality control in precision optics; a simple plan for prisms; milling-machine problems. Charts, diagrams, illustrations, and tables.

I30 ———— (July, 1945) 2, 1:10-14

Use of correlation in quality control. Peter P. DiPaola.

How correlation technique is used at Curtiss-Wright Corp., Airplane Division, Kenmore Plant to control quality on the assembly line. Improvement in quality-control technique by use of regression line control chart in place of standard "c" chart (Poisson approximation). Tables.

I31 ———— (July, 1945) 2, 1:18-19

Book review of *Management of Inspection and Quality Control* by J. M. Juran.

Review by Martin A. Brumbaugh. See also: *Mechanical Engineering* (June, 1945) 67:417; *American Statistical Association, Journal* (September, 1945) 40:395-396.

I32 ———— (September, 1945) 2, 2:3-7

Sequential sampling inspection for attributes. H. A. Freeman.

An introductory article on the new technique. Phases of a sampling plan; sequential plan of action; protection afforded by the sequential plan of action; the operating characteristic curve; cost of the plan of action; the average-sample number curve; some elements of algebra of sequential sampling for attributes; example and summary; comparison of single, double, and sequential sampling inspection. Diagrams and tables.

I33 ———— (September, 1945) 2, 2:7-8

Quality control in the small plant. R. N. Youngblood.

Short article setting forth reasons why the small plant can use statistical quality-control methods to advantage; limitations on use in small plants; quality inventory required; adaptation under conditions of continuous production and short-run production; workers' attitude.

I34 ———— (September, 1945) 2, 2:9-10

Operating characteristics of reject limits for measurements. N. L. Enrick.

Discussion of sampling plan used by Quartermaster Corps, Inspection Service. Article develops operating characteristic curves and "L" factors. Formulae are given. Table and chart.

I35 ———— (September, 1945) 2, 2:11-12

A report on prewar quality. Martin A. Brumbaugh.

A short article presenting frequency diagrams describing the difference between prewar and current quality in piece parts of one large manufacturer. The credit for important improvements is attributed to the use of control charts. Diagrams.

I36 ———— (September, 1945) 2, 2:15

Articles of federation between the several quality control engineer societies.

Cooperation articles between the Buffalo, Rochester, Syracuse, and Michigan societies stating the objectives of the federation.

I37 ———— (November, 1945) 2, 3:3-6

Quality control in the manufacture of ball bearings. Charles R. Scott, Jr.

Sets forth the difficult and complex problem of control in the manufacture of ball bearings; relationship between the approach toward perfection and mounting cost. Describes the purpose of the quality-control department; objectives of control; organization; reinspection; gauge control; quality records; control of purchased material; quality of the finished product; control of production. Conclusions regarding benefits to SKF Industries of statistical quality control.

I38 ———— (November, 1945) 2, 3:6-8

Fraction defective of battery adapter used in Handie-Talkie. F. A. Palumbo and E. S. Strugala.

Description of the problem and the statistical approach used to solve it with summary of results. Illustrated with control charts and tables of data before and after process changes.

I39 ———— (November, 1945) 2, 3:9-11

Limits for control charts. Preston C. Hammer.

Discusses why control-limit formulae cannot be used blindly and points out ways of obtaining satisfactory limits; percentages of rejections; "p" chart; the moving-range method; the Poisson distribution and the "c" chart; useful variations of the average chart. Cases and illustrations cited throughout.

I40 ———— (January, 1946) 2, 4:3-5

The effect of a number of variables on a quality characteristic. C. Goffman.

Discussion of a systematic plan for collecting and analyzing data to obtain information on the average effect of each factor on the quality characteristic where the other factors considered vary over a predetermined range. Examples show how to use formulae and tables presented.

I41 ———— (January, 1946) 2, 4:6-10

Statistical quality control; what it is and what it does. William B. Rice.

An excerpt from the introduction of a forthcoming book *Control Charts in Factory Management.* Considers quality control as profit control and gives illustrations of ways to gain economy through improving the process, the inspection, and the design, changing the user's idea of what is best for his requirements.

I42 ———— (January, 1946) 2, 4a:2-3

Postwar quality control. G. D. Edwards.

Traces interest in quality control from prewar years, through the war, and into postwar. Expansion held to be due to war stimulus. Responsibility now resting on quality-control engineers to use their influence to keep industry quality minded from the top down. Need for simpler procedures. Importance of discussion and dissemination of procedural information. Competition is to force greater use of quality-control methods.

I43 ———— (January, 1946) 2, 4a:4

The U. S. Army Ordnance Department's use of quality control. H. F. Safford.

Describes the great use of quality-control methods in acceptance inspection of finished items; necessity for reducing manpower on inspection work for the billions of dollars worth of nonindustrial matériel procured from industry. Development of systematic and standardized sampling inspection plans using the Ordnance Standard Sampling Tables. Savings resulting from methods, in dollars and manpower. Important factor was the use of quality-control methods by the manufacturers.

I44 ———— (January, 1946) 2, 4a:4-8

Electrical products: quality control—a tool of management. J. Manuele.

Author deplores company publications on quality control containing incorrect definitions, calculations, and conclusions. Cites typical examples from own experience utilizing frequency distributions, control charts, and correlation techniques. States that the day has passed when it was necessary to sell statistical methods to management. Charts and tables.

I45 ———— (January, 1946) 2, 4a:8

Radio industry: peacetime responsibilities and opportunities in quality control. A. I. Peterson.

Author feels that the surface of industrial quality control has been barely scratched. Need is for development of broad competence in technical and statistical control; support of quality-control societies for exchange of experience is one of the best ways of growing up with the profession. Basic training in statistics is needed for the many whose jobs support the administration of quality.

I46 ———— (January, 1946) 2, 4a:9

Radio industry: quality control in the radio industry. J. Clark Ryan.

Test of a new department or expansion of an existing one rests upon question of total cost reduction. Quality control in Colonial Radio Corporation has improved product, and made notable savings. Greatest gain for the future perhaps lies in establishment of an objective basis of understanding between suppliers and plant engineering, manufacturing, inspection, and management.

I47 ———— (January, 1946) 2, 4a:9

Steel products: quality control at work. P. C. Clark.

Hunter Pressed Steel Company has used statistical methods for quality control for a number of years; found it unnecessary that key inspection personnel be some sort of junior statisticians. In-plant training is given to existing personnel. All chart and paper work and measuring and testing of samples is performed by girls. This frees lead inspectors for interpretation of data and for taking action. Company made savings on two fuse components through the reduction in cost directly assignable to the application of quality-control techniques which was sufficient to defray entire cost of the inspection department for a period of almost a year.

I48 ———— (January, 1946) 2, 4a:9-10

Steel products: the economies of quality control at the English Needle and Fishing Tackle Co., Studley, Warwickshire, England. William A. Bennett.

Achievements consist of integration of the inspection function into the process of manufacture; provision of factual knowledge regarding process capabilities; economic distribution of machines and operatives based on an ability to meet process limits; and re-establishment of pride of workmanship.

I49 ———— (January, 1946) 2, 4a:11

Foundry: statistical quality control in the foundry. R. W. S. Freeman.

Describes very briefly the use of control charts, correlation, and contingency tests at various steps in the foundry process.

I50 ———— (January, 1946) 2, 4a:11-12

Tractors: quality control. F. J. Halton.

Explains how the John Deere Tractor Works introduced statistical quality control. Cites definite evaluated savings from the quality-control program.

I51 ———— (January, 1946) 2, 4a:12

Gage manufacture: quality control management's guardian. C. V. Johnson.

States in effective manner the satisfaction of Johnson Gage Company with quality and production attained through following simple horse sense "quality control" policy: through proper engineering, particularly as regards tolerance specifications; suitable machine equipment (and working conditions); properly guided and supervised operators; effective process inspection methods and available equipment; immediate manufacturing department analysis of error (or trend toward error); immediate and authoritative elimination of "cause of error"; operator responsibility and accountability; and recognition of operator proficiency by management.

I52 ———— (January, 1946) 2, 4a:12-13

Gage manufacture: quality control a bargain. C. W. Kennedy.

Describes example of how the Federal Products Corporation benefited from the use of quality-control methods and cites savings made.

I53 ———— (January, 1946) 2, 4a:13-14

Optical: postwar expansion of quality control system. T. B. Drescher.

Although the Bausch and Lomb Optical Company claims that control of quality has been the foundation upon which its business has been conducted for nearly a century, the modern concepts of statistical quality control have proved of inestimable value during the war years. Author explains use of charts in various departments; development of an index of quality; and intention of the company to expand the use of quality-control methods in postwar years. Charts.

I54 ———— (January, 1946) 2, 4a:14

Chemical: quality control in chemical manufacture. James A. Mitchell.

Describes the utilization of statistical quality-control methods by the Cellulose Esters Division of the Tennessee Eastman Corporation and cites savings of hundreds of thousands of dollars in 1945 due to these methods.

I55 ———— (January, 1946) 2, 4a:15

Chemical: accuracy of measurement. Maurice Milbourn.

Discusses the part played by measurement in the progress of modern industrial production; the necessity for design of experiments and use of quality-control techniques in chemical manufacture.

I56 ———— (January, 1946) 2, 4a:15

Rubber: quality control by statistical methods. G. H. Cassady.

A testimonial to the effectiveness of the use of statistical quality-control methods in the rubber industry during the war and belief in their retention in the coming days of peace.

I57 ———— (January, 1946) 2, 4a:15-16

Textile: statistical control a permanent feature. A. G. Ashcroft.

Alexander Smith and Sons Carpet Company began the application of statistical techniques and the use of the control-chart method in their Research and Product Engineering Laboratories in 1934. This is a testimonial as to the effectiveness of these methods in the war period and reliance on them in development work in connection with test methods, processing changes, and comparison of equipment.

I58 ———— (January, 1946) 2, 4a:16-17

Air conditioning: quality control. E. F. Graumenz.

Enumeration of results achieved through the use of statistical quality control in the Receiving Inspection Department of the Carrier Corporation. How the methods are used for trouble-shooting in other departments.

I59 ———— (January, 1946) 2, 4a:17

Distribution: control charts locate errors. J. M. Ballowe.

A brief statement of savings made by Aldens Chicago Mail Order Company through control of errors by use of the control chart.

I60 ———— (January, 1946) 2, 4a:17

Receiving inspection: quality control in receiving inspection. O. W. Hitchcock.

Describes how statistical techniques have made it possible to reduce receiving inspection at Scintilla Magneto Division of Bendix Aviation Corp. twenty-five per cent, speed up the work on many jobs, and still keep the emphasis on quality.

I61 ———— (January, 1946) 2, 4a:17-18

Sub-assembly inspection: sub-assembly inspection pays dividends. H. H. Kent.

Recounts some of the gains to be derived from subassembly inspection as discovered through the experience of Eastman Kodak Company with statistical quality control; difficulty in installing subassembly inspection; savings cited.

I62 ———— (January, 1946) 2, 4a:18

Final inspection: the money value of industrial statistics. Paul Peach.

Describes experiences in manufacture of ordnance matériel; the testing of primers and how a useless test was converted from a waste to something valuable and useful; savings made through accuracy testing and application of mathematical statistics and control charts to manufacturing problems.

163 ———— (January, 1946) 2, 4a:18-19

Implications of statistical quality control. Ralph E. Wareham.

A brief statement of the benefits to be derived from the application of a successful program of quality control.

164 ———— (January, 1946) 2, 4a:19

Editor's Summary. Martin A. Brumbaugh.

Several pertinent observations based upon the editing of the Special Management Issue covering "Industry's Use of Quality Control." Editor cites eight cases of savings made drawn from his personal experience to substantiate the statement that many of the most important gains from the use of quality control cannot be reported because they are being held as competitive secrets.

165 INDUSTRIAL STANDARDIZATION (February, 1936) 7:37-40

Standard quality maintained by statistical methods. John Gaillard.

Review of *The Application of Statistical Methods to Industrial Standardization and Quality Control* by E. S. Pearson, published by the British Standards Institution as B.S. 600-1935. See *Mechanical Engineering* (May, 1936) 58:326-328; and (April, 1937) 59:261-262 for further reviews and references to this manual.

166 ———— (May, 1940) 11:109-118

How statistics help the engineer in control of production quality. John Gaillard.

A lengthy illustrated review of *Statistical Method from the Viewpoint of Quality Control* by Walter A. Shewhart. Compares the traditional quality-control approach with statistical quality-control methods. For other reviews see *Franklin Institute, Journal* (July, 1940) 229:816-817; *Mechanical Engineering* (June, 1940) 62:475-476; *Royal Statistical Society, Journal* (1940-1941) Sup. 7, No. 1: 86-87.

167 ———— (June, 1941) 12:137-141

Quality control: an improved method; guide for quality control and control chart method of analyzing data. John Gaillard.

Review of *Guide for Quality Control,* Z1.1-1941, and *Control Chart Method of Analyzing Data,* Z1.2-1941, published by American Standards Association at the request of the War Department. These are emergency standards for war production.

168 ———— (May, 1942) 13:109-110

New standard shows how to control quality during production.

Review of *Control Chart Method of Controlling Quality during Production,* Z1.3-1942, published by American Standards Association at the request of the War Department.

169 ———— (May, 1942) 13:111

British adopt American quality control standards.

Announcement of the publication of B.S. 1008-1942 covering American Standards Association *Guide for Quality Control,* Z1.1-1941; and *Control Chart Method of Analyzing Data,* Z1.2-1941. Gratification is expressed for

the unification of national practices in the United States and Great Britain in the field of statistical control of quality that has grown from the co-operation between groups of experts of the two countries.

I70 ———— (June, 1942) 13:155-157

Ordnance inspection. R. H. Somers.

Growth of statistical quality control in importance in war production is reported; explanation of the use of quality-control chart in the Ordnance Department.

I71 ———— (April, May, 1943) 14:123-127, 155-158

Refined quality control speeds up production. John Gaillard.

An outline of the benefits to be derived from the use of quality-control charts. Describes the scientific approach to quality control with special reference to the three American War Standards for introduction of the methods. See *American Machinist* (December 10, 24, 1942) 86:1430-1432, 1498-1500.

I72 ———— (February, 1944) 15:33

South Africa considers statistical method of quality control.

A short article stating that the South African Standards Institute has asked its sectional committee to consider the possible application of the statistical methods of quality control to South African industry—not only as a war measure but with a peacetime objective toward its use as an integral feature of modern manufacturing production. American War Standards for quality control are now in use in Great Britain, Canada, and Australia.

I73 ———— (February, 1945) 16:41-44

How should laboratory tests be used in postwar textile programs? A. G. Ashcroft.

Abstract of an address before American Association of Textile Chemists and Colorists; analyzes the principles governing the laboratory tests to standards in the textile field. An important article in view of the intention of the American Standards Association to expand its work to include ultimate consumers goods. Outlines types of quality criteria developed by Walter A. Shewhart in "Some Aspects of Quality Control" (*Mechanical Engineering,* December, 1934, 56:725-730). Type III is that which makes a thing desired by some group of people and this is often mistaken for a dressed-up type II, defined as "that which characterizes a thing A in its relation to another thing B and independent of human volition or interest." Explains what a test of wantableness is; problems of interpretation of tests; outlines a new attitude toward laboratory tests and sets forth a detailed form of presentation of test data so they will be limited to their legitimate field of usefulness.

I74 ———— (March, 1945) 16:77

W.P.B. announces new courses on quality control.

Courses at Ohio State University, Northwestern University, and the University of Iowa are announced. Thirty other courses had been offered prior to these by W.P.B. and the Office of Education. Briefly states the advantages of the use of statistical quality-control methods.

I75 ———— (May, 1945) 16:103-104

How statistics will help in postwar textile problems. Leonard Kuvin.

Emphasizes the increasing importance of technology in the textile field and calls attention to the increasingly widespread use of the statistical method of quality control in many industries, pointing out the need of this method in postwar textile industry. Outlines five principal categories of interest: (1) sales service and solution of complaints; (2) product and process development; (3) quality control in manufacture—most textile manufacturers have not adopted these methods or have not even heard of them; however, their rapid spread throughout the industry is assured; (4) market research; (5) merchandising.

I76 ———— (June, 1945) 16:117

How SKF Industries use quality control standards.

Brief article covering part of a talk given by C. R. Scott before the American Society of Mechanical Engineers; deals with the responsibilities resting upon the quality-control department for control of quality in a plant where approximately 700 or 800 machines grind 200,000 parts a day to a tolerance of from .0002 to .0003 of an inch. Cost of keeping accurate records is offset by savings made possible through establishment of scientific procedures reducing the amount of inspection necessary.

I77 INDUSTRY ILLUSTRATED (British) (March, 1942) 10

The statistical control of quality in production engineering.

Not available for review.

I78 INSTRUMENTS (December, 1942) 15:506-509

Some potshots at this relative thing called precision. I. A. Hunt.

Illustrated article regarding underlying causes in the human factor involved in success or failure to obtain precision work; explains various types of gauges and their use.

I79 ———— (January, 1943) 16:18-19

Automatized statistical control. H. Ziebolz.

Describes a device called a "trend analyzer" for mechanically producing necessary graphs (frequency distribution curves) of lots tested. A record of the distribution curve obtained by such a device can be used for analysis of the causes of deviation from a given standard; the record will show the changes resulting from different manufacturing methods, machines, or the progress of individual operators.

I80 IRON AGE (December, 1938) 142:20-22

Quality control of steel. R. F. Bisbee.

Short article describing how the Westinghouse Electric and Manufacturing Co. plant, Mansfield, O., controls quality of products by controlling "bought outside" material. Illustrations.

I81 ———— (May 11, 1944) 153:56-60

Statistical methods of quality control. C. Stirewalt and J. Bordeaux.

Presents the benefits of statistical quality control; the nature of the problem faced; how control limits of variation are used. Illustrations are taken from data of hourly sampling of length measurements on a screw machine part. Charts and tables.

I82 ———— (August 3, 1944) 154:122

Quality control by statistical methods, conference subject; Case School of Applied Science.

Article refers to one of the courses in statistical quality control held throughout the United States beginning in 1942.

I83 ———— (February 15, 1945) 155:70-74

A simplified approach to quality control. George O. Cutter.

Attempts to provide a simple working plan for both acceptance control and process control inspection. This is not an elucidation of the mathematical theory of statistical quality control. Types of inspection are discussed. Vendor is furnished a list of major and minor dimensions. Describes acceptance numbers and use of single and double sampling table; example of control procedure discussing selection and size of samples; use of samples, control limits for control chart, and interpretation of chart. Diagram, tables, short bibliography.

I84 ———— (March 22, 1945) 155:100

W.P.B. reports on use of statistical methods for improved quality.

Short article giving several factual instances of industrial savings through use of statistical quality control.

M1 MACHINE DESIGN (April, 1944) 16:172-174

Choosing the right material. V—Reliability and probability. H. W. Gillett.

This article, one of a series on materials, briefly discusses the need of a general grasp of the idea of scatter (dispersion) of quality characteristics which, with horse sense on the part of the engineer, will lead to much the same conclusions and the same remedial actions that the specialist might arrive at by devious mathematical paths. Diagrams and charts.

M2 ———— (July, 1945) 17:135-138

Statistical control—the yardstick of performance. Roger W. Bolz.

Discusses the advantages of using statistical tests to check the uniform operation of machines and processes. Describes a problem involving control of extremely close tolerances on relative pitch diameters of a special double-taper threaded part produced in two operations on an automatic thread miller. Type of dial indicator gauging arrangement and control charts are shown. Charts and diagrams.

M3 MACHINERY (United States) (August, 1938) 44:825-830

Controlling the quality of 87,000 different parts. C. E. Stines.

An interesting system of inspection used by the National Cash Register Company is described. The system is not based on the Shewhart technique of quality-control charts. Illustrated.

M4 ———— (January, 1944) 50:167-172

Maintaining quality control of machined parts. A. L. Atherton and L. C. Young.

Describes how a system of statistical quality control is being used successfully in connection with the inspection of machined parts at the Westinghouse Electric and Manufacturing Co. plant, East Springfield, Mass. A popular nonmathematical presentation with quality-control charts illustrated and explained. Presents a method of determining when the ratio of rejections to a given number of pieces produced, which is established as permissible, is at as low a level as possible. Illustrates the index of variability with factors for limits on average measurement and range of measurements. Eight benefits of the quality-control procedure at this plant are summarized. Charts and tables.

M5 MACHINERY (British) (March 21, April 11, 1940) 55:696-701; 56:51-60

Statistics and engineering practice. B. P. Dudding and W. J. Jennett.

See comment under *Electrical Engineers, Institution of, Journal* (July, 1940) 87:1-21. For other references to this address see *General Electric Company Journal* (British) (July, 1940) 11:No. 3; *Mechanical World* (May 2, 16, 23, 1941) 109:310-312, 343-344, 361-363.

M6 ———— (April 2, 9, 1942) 60:257-260, 291-295

Quality control in production engineering. H. Rissik.

Reviewed in *Engineering Index* (1942) page 1031. Discusses the importance of statistical control in production engineering and how to apply control charts effectively to production processes.

M7 ———— (April 23, 1942) 60:346

Quality control.

Leading article referring to this scientific field of study which had just received special notice the preceding week in London.

M8 ———— (April 23, 1942) 60:347-351

The application of statistical control of quality.

The first of two articles reporting on discussion of statistical control presented before the joint meeting of the Institutions of Civil, Electrical, and Mechanical Engineers, held in London, April 15, 1942. Abstracts of talks by C. G. Darwin and Frank Gill. See this journal (April 30, 1942) 60:383-384. For details of the meeting see *Engineering Journal* (Engineering Institute of Canada) (January, 1943) 26:11-17; also, *Electrical Engineers, Institution of, Journal* (July, 1942) 89, part 1:303-311. Complete report in *Mechanical Engineers, Institution of, Journal and Proceedings* (June, 1942) 147:125-144.

M9 ———— (April 23, 1942) 60:360

Quality control in production engineering.

Letter to editor from C. J. Potts criticising the statistician and his technique as a feature of production in engineering. See reply in this journal (May 28, 1942) 60:490.

M10 ———— (April 30, 1942) 60:383-384

The application of statistical control of quality.

The second of two articles reporting on the discussion of statistical control presented before the joint meeting of the Institutions of Civil, Electrical, and Mechanical Engineers, held in London, April 15, 1942. Abstracts of talks by C. G. Darwin and Frank Gill. See this journal (April 23, 1942) 60:347-351.

M11 ———— (May 28, 1942) 60:490

Quality control in production engineering.

Letter to editor by R. Royan replying to C. J. Potts. See this journal (April 23, 1942) 60:360.

M12 ———— (July 23, 1942) 61:89

Practical control of quality. A. N. Appleby.

Reviewed in *Engineering Index* (1942) page 872. A scheme for making operators "quality minded" is described. This is termed an attempt to bridge the gap between accuracy and efficiency.

M13 ———— (July 30, 1942) 61:118

Quality control developments.

Explains that since the London meeting on April 15, 1942, engineers throughout England have shown a lively interest in statistical quality control and the development of its use has been rapid.

M14 ———— (August 13, 1942) 61:169-172

Pioneering achievement in quality control. H. Rissik.

Reviewed in *Engineering Index* (1942) page 872. A report on an analysis by the author and R. Royan of Creed and Co., Ltd., Croydon, of the organization of the inspection department. A detailed description of the application of quality-control methods to process operations. This company is described as the first production engineering organization in Great Britain actually to apply the technique of quality control to its machine-shop processes. The cost of producing and rectifying defective work was cut fifty per cent in six months' operation.

M15 ———— (October 29, 1942) 61:485

Quality control—a shop problem. W. B. Fowler.

See *Engineering Index* (1943) page 846. Suggestions are offered for introduction of statistical quality control. Discussion of inspection records and routines.

M16 ———— (January 14, 1943) 62:41

Quality control v. direct inspection. H. Biggs.

Reviewed in *Engineering Index* (1943) page 563. Practical and economic value of statistical quality control compared with direct inspection method; relative advantages and disadvantages of both methods are listed. Author suggests a system of direct inspection as more practical than control-chart method in which Inspection Department is given percentage of error over and above engineering limits which he calls "acceptance tolerance."

M17 ———— (July 1, 1943) 63:10-16

Recent developments in quality control. H. Rissik.

Reviewed in *Engineering Index* (1943) page 563. Author refers to article by H. Biggs, this journal (January 14, 1943) 62:41 claiming that Biggs, in common with many other engineers coming up against quality-control inspection techniques for the first time, missed the point of the control chart. Article not a criticism but aims to clarify by further discussion of "control limits" in place of engineering limits as basis for taking corrective action in the machine shop.

M18 ———— (October 7, 1943) 63:407-410

Statistical quality control in practice. O. H. Rachwalsky.

Reviewed in *Engineering Index* (1944) page 1003. Explanation of where to use statistical quality control; advocates that batches be at least 2,000, made on automatic or semi-automatic machines, especially when retooling is not too frequent. Advantages of application of statistical quality control cited and example of use given.

M19 ———— (December 23, 1943) 63:701-706

Practical application of quality control. W. A. Bennett and J. W. Rodgers.

Reviewed in *Engineering Index* (1944) page 840. Application of quality control to production of small metal components made to close engineering tolerances on single- and multiple-spindle machines; principles underlying successful practice; analysis of results of percentage-defective charts to determine which dimensions require dimensional control; dimensional control as against inspection; detection of error.

M20 ———— (January 13, 1944) 64:42-43

Inspection efficiency. W. A. Bennett and J. C. Edwards.

See *Engineering Inspection* (Winter, 1943) 8:12-21. Reviewed in *Engineering Index* (1944) page 545.

M21 MANAGEMENT REVIEW (September, 1941) 30:335-336

Statistical methods of quality control. Leslie E. Simon.

Abstract of article, "On the Initiation of Statistical Method for Quality Control in Industry" by L. E. Simon in *American Statistical Association, Journal* (March, 1941) 36:53-60. See note under this item.

M22 ———— (April, 1945) 34:140-143

Abstract of "Introducing Modern Quality Control Techniques" by J. M. Juran. Not available for review.

M23 MANUFACTURING AND INDUSTRIAL ENGINEERING (October, 1945) 23:46-47

Statistical quality control. A. E. R. Westman.

Not available for review.

M24 MANUFACTURING INDUSTRIES (February, 1926) 11:125-128

Finding causes of quality variations. Walter A. Shewhart.

Original article dealing with the idea of establishment of tolerance limits for average, range, or shape of observed distributions of measurements; of assignable causes for changes in the random or chance system of causes. The problem is to judge the future in terms of the past. The solution is to reduce the data to natural laws, if possible, or to laws of chance. One of the first popular discussions of methods of determining when variations in quality should be left to chance. Diagrams.

M25 ———— (November, 1928) 16:517-519

Using inspection data to control quality; Bell Telephone Laboratories. H. F. Dodge.

Describes a method of finding out at what point maximum quality is obtained at minimum costs, and setting limits of permissible quality variation. Quality-control charts of percentage defective are illustrated. Application when per cent defective is extremely small. Charts. See also: *Bell System Technical Journal* (April, 1928) 7:350-368, and this journal (December, 1928) 16:613-615.

M26 ———— (December, 1928) 16:613-615

A method of rating manufactured product. H. F. Dodge.

Outlines method of statistical quality control; main objective is control of quality of finished product but also it measures workmanship of individuals and groups of operators. Use of quality-control charts in a problem of control of quality of finished products of particular interest in the telephone business. Tables, charts, and examples. Mathematical appendix. See also *Bell System Technical Journal* (April, 1928) 7:350-368, and this journal (November, 1928) 16:517-519.

M27 MATERIALS AND METHODS (October, 1945) 22:1097-1101

Statistical quality control of methods and materials. Edwin G. Olds.

Not available for review.

M28 MECHANICAL ENGINEERING (September, 1924) 46:546-547

Measurement of the quality of product. G. S. Radford.

Discusses a proposal to measure quality of product by the rating ratio derived by dividing goods produced which pass all inspections by the total of goods produced. Conclusions drawn as to nonfeasibility and undesirability of such measurement. Sets up standards for measurement of inspection function. Discussion by five engineers presented on page 547.

M29 ———— (November, 1932) 54:778-780

Applications of statistical method in engineering and manufacturing.

Report of Joint Committee sponsored by the American Society of Mechanical Engineers and the American Society for Testing Materials on "Development of Applications of Statistics in Engineering and Manufacture." Applications prior to and since 1929 were reported. Bibliography.

M30 ———— (December, 1934) 56:725-730

Some aspects of quality control. Walter A. Shewhart.

Gives an explanation of quality aspects of the problem of control. Necessity for adequate information is set forth. How these data may be obtained. Need to provide inspection specifications distinct from design specifications and for keeping a running record of inspection data in control of quality.

M31 ———— (October, 1935) 57:636-637

Effective handling of quality complaints. H. Benson.

Outlines duties and responsibilities of the quality-control department; methods of quality measurement. Quality-control organization and duties of members; types of statistical reports required; importance of understanding between quality-control department and manufacturing departments.

M32 ———— (October, 1935) 57:638-642

Quality control in manufacture. F. J. Feely.

Shows methods of Western Electric Co. Presents control charts; describes line inspection's part in quality control and factors which influence quality; gives results from quality-control program. Description of influence of product design, raw materials, manufacturing methods, equipment, technique, and sampling inspection. Charts.

M33 ———— (October, 1935) 57:643-644

Inspectors' errors in quality control. J. M. Juran.

A short article with a general classification of types of inspectors' errors including: errors in reading measuring instruments, errors in judgment, and errors in recording. Methods are described for checking on the work of inspectors. Charts.

M34 ———— (October, 1935) 57:645-646

Statistical aspects of sampling inspection plans. H. F. Dodge.

Short article discussing some of the statistical aspects of the problem in setting up economical sampling inspection plans. Illustrations of sampling by method of attributes and sampling by method of variables. Charts.

M35 ———— (May, 1936) 58:326-328

Statistical methods. L. K. Sillcox.

Review of *The Application of Statistical Methods to Industrial Standardization and Quality Control* by E. S. Pearson. Other reviews: this journal (April, 1937) 59:261-262, and *Industrial Standardization* (February, 1936) 7:37-40.

M36 ———— (April, 1937) 59:261-262

Statistical methods for quality control. H. A. Freeman.

Historical statement of development and use of statistical quality control in the United States and Great Britain; reasons for slowness in spread of methods; training necessary in the field of quality-control statistics and need of courses in the technique. Review and criticism of *The Application of Statistical Methods to Industrial Standardization and Quality Control* by E. S. Pearson. Author outlines a course of reading in statistical quality control.

M37 ———— (October, 1937) 59:755-758

Interchangeable manufacture. J. W. Roe.

A short but interesting article on the history of interchangeable manufacture in America. See also *Franklin Institute, Journal of* (November, 1944) 238:335-344 for additional information on this subject.

M38 ———— (June, 1940) 62:475-476

Statistical method. L. C. Young.

Book review of *Statistical Method from the Viewpoint of Quality Control* by Walter A. Shewhart. See other reviews in *Franklin Institute, Journal* (July, 1940) 229:816-817; *Industrial Standardization* (May, 1940) 11:109-118; *Royal Statistical Society, Journal* (1940-1941) Sup. 7, No. 1: 86-87.

M39 ———— (May, 1942) 64:361-364

Quality control with sampling inspection. C. S. Barrett.

Description of procedure for controlling quality in welding contacts. Value of statistical techniques to the engineer. Gives detailed explanation of five important factors causing variation in the strength of weld. Charts. See discussion in this journal (September, 1942) 64:678.

M40 ———— (August, 1942) 64:613-614

Book review of *Industrial Statistics* by H. A. Freeman. Review made by G. P. Wadsworth.

M41 ———— (September, 1942) 64:673-675

Quality control procedures in ordnance inspection. G. D. Edwards.

Description of the part which quality-control techniques have in the procedures involved in securing definite evidence of the adequate quality of material before acceptance by the U. S. Army Ordnance Department. See *Engineering Inspection, Institution of, Journal* (Summer, 1943) 8:29-33. Also abstract in *Engineering Index* (1943) p. 750.

M42 ———— (September, 1942) 64:678

Quality control. H. F. Dodge.

Discussion of article "Quality control with sampling inspection" by C. S. Barrett, this journal (May, 1942) 64:361-364. Short comment approving procedure described as a model of simplicity in sampling inspection, and which, because it exerts economic pressure on the production group, serves to provide a definite quality incentive.

M43 ———— (April, 1943) 65:277

Recent publications on statistical methods. H. A. Freeman.

Review of current economic literature affecting engineering. Includes bibliography.

M44 ———— (November, 1943) 65:805-808

Management problems in judging quality conformance in the inspection function. J. M. Juran.

The problems of judgment are explained; discusses situations where judgment is not required. Discusses acceptance of materials not conforming with manufacturing limits, and acceptance of conditions of poor

workmanship. Deals with situations involving conflicting measurements; division of responsibility handling rejections. Article derived from Chapter 4 of author's book *Management of Inspection and Quality Control.*

M45 ———— (March, 1944) 66:173-177

Some principles of the Shewhart methods of quality control. W. Edwards Deming.

Excellent illustrated article explaining what the statistical method does, its underlying principles, different kinds of variability, and the problems present in the production or purchase of materials. Illustrates how the quality-control chart works; discusses the responsibility of management; and cites new uses of statistical quality control. Bibliography.

M46 ———— (March, 1944) 66:179-182

Quality control in manufacture of small arms ammunition. H. M. Smallwood.

An excellent article illustrated with charts. Popular presentation explaining process components of small-arms ammunition and dimensional-control problems. What problems are faced on the institution of quality-control methods and results of the program.

M47 ———— (May, 1944) 66:319

Quality control: a useful management tool. C. S. Gotwals.

In a few paragraphs, a practical quality-control engineer expresses the reasons why quality control is a "must" job ahead for management. This is one of ten brief forecasts in the management field covering the job ahead for management.

M48 ———— (August, 1944) 66:529-535

A.B.C. of quality control. J. M. Juran.

A nontechnical presentation explaining acceptance and control sampling, operational and corrective sorting, the meaning of a state of control, and assignable causes of variation. Describes control charts, their uses, and cites benefits to be derived therefrom. Article derived from Chapter 6 of a forthcoming book. Charts. See *Glass Industry* (August, September, 1944) 25:358-360, 407-408.

M49 ———— (December, 1944) 66:801-803

Setting tolerances scientifically. W. B. Rice.

An interesting article setting forth the divergent views of designing, inspection, and production departments as to tolerances; what can be done to bring the viewpoints of these three departments into accord. A practical problem is stated and statistical methods outlined for its solution. Tables.

M50 ———— (March, 1945) 67:168-170

Maintaining scientific tolerances by inspection. W. B. Rice.

Sets forth the requirements to be met before inspection can succeed in maintaining the characteristics wanted in a product, namely: (1) dependability of the process (obtainable through use of quality-control charts); (2) that specifications are practical and profitable; (3) that inspection procedures are adequate. This article is concerned with the third require-

ment. Explains concepts involved, use of control-chart technique, and problem of assembly inspection. Diagram. For review see *Metals and Alloys* (June, 1945) 21:1736.

M51 ———— (April, 1945) 67:276-277

Book review of *Sampling Inspection Tables* by H. F. Dodge and H. G. Romig. Review made by Eugene L. Grant. See review in *American Statistical Association, Journal of* (September, 1945) 40:383-384 by K. J. Arnold. Also, in *Nature* (April 14, 1945) 155:438-439 by M. G. Kendall.

M52 ———— (June, 1945) 67:417

Book review of *Management of Inspection and Quality Control* by J. M. Juran. The subject matter of this book divides broadly into four categories: the performance of the actual inspection work, including problems of quality specifications, measurement accuracy, sampling, etc.; the use of inspection data; the internal organization of the inspection department and its place in the plant organization; and the general philosophy of inspection and quality control with the necessary management controls for effective coordination. See reviews in *American Statistical Association, Journal of* (September, 1945) 40:395-396; and *Industrial Quality Control* (July, 1945) 2, 1:18-19.

M53 MECHANICAL ENGINEERS, INSTITUTION OF, JOURNAL AND PROCEEDINGS (June, 1942) 147:125-144

Application of statistical control to the quality of materials and manufactured products.

A full report of the joint meeting of the Institutions of Civil, Electrical, and Mechanical Engineers, London, April 15, 1942. Illustrated.

M54 ———— (1945) 152:69-75

Inspection efficiency. J. C. Edwards and W. A. Bennett.

Outlines the numerous directions in which improvements can be sought in engineering inspection, including carefully-planned methods of recording results and statistical quality control, adopting principles of time and motion study in planning the flow of work through inspection, and in design of gauging fixtures and arrangement of gauges. Careful selection of personnel is emphasized. Savings made by the English Needle and Fishing Tackle Co. through adopting these methods over a period of several years are cited. Charts, diagrams, and tables.

M55 ———— (1945) 152:76-81

The application of statistical methods to the control of industrial costs. N. R. Neal.

Use of statistical quality-control charts aid in control of abnormal time or cost. Several examples are given of the use of control charts for total excess-cost index, man-hours and cost for lathes, and total man-hours and grand total cost. Diagrams, charts, table.

M56 ———— (June, 1945) 152:81-92

Sampling schemes for qualitative inspection. A. W. Swan.

Qualitative and quantitative inspection are contrasted; factors in setting up sampling schemes for qualitative inspection; deciding on maximum al-

lowable percentage of defectives, best sample size, and "pass up to" number. Part 1: Single sampling; Part 2: Double sampling. Changes in quality level; producers' and consumers' risks; table for selecting sample size. Important article. Charts and tables.

M57 MECHANICAL WORLD (June 21, 1940) 108:539

Statistical methods and factors of safety—an argument for the revision of existing standards. W. T. O'Dea.

Not available for review. See annotation under *Electrical Engineers, Institution of, Journal* (July, 1940) 87:22-32.

M58 ———— (May 2, 16, 23, 1941) 109:310-312, 343-344, 361-363

Statistics and engineering practice. B. P. Dudding and W. J. Jennett.

See annotation under *Electrical Engineers, Institution of, Journal* (July, 1940) 86:1-21. Also see *Machinery* (British) (March 21, April 11, 1940) 55:696-701; 56:51-60.

M59 ———— (October 24, 1941) 110:281-283

Applications of statistics to engineering. G. W. Stubbings.

Reviewed in *Engineering Index* (1942) page 1140. Applications of statistical theory and technique in the field of practical engineering; testing for variations; specifications; defectives in batches.

M60 ———— (October 23, 1942) 112:383-384

Reviews of British Standards No. 600R-1942 *Quality Control Charts* by B. P. Dudding and W. J. Jennett. See *American Statistical Association, Journal* (September, 1945) 40:386; *Engineer* (September 4, 1942) 174: 195-196.

M61 ———— (October 15, 1943) 114:431-434

Quality control; examination of basic principles of new inspection technique. J. W. Parker.

Abstracted in *Engineering Index* (1944) p. 846. Deals with the functions of inspection; fundamentals of quality control; study of quantitative data; and functions of statistical parameters.

M62 METAL INDUSTRY (November 24, 1944) 65:322-324

Quality control; application to the inspection of light alloy castings. F. A. Allen.

Not available for review.

M63 ———— (March 2, 9, 1945) 66:130-133, 146-149

Quality control: use of statistical methods in metallurgical industry. B. P. Dudding and W. J. Jennett.

Not available for review.

M64 METAL PROGRESS (September, 1931) 20:94-98

Statistical control; how new science promotes uniformity of product. A. Hayes and R. F. Passano.

An early exposition of the use of quality-control charts in the manufacture of steel in the American Rolling Mill Co. Statement of influences of varia-

tion at work. Variables must be studied. Opportunities in statistical control are cited. Authors state that many, even in some of the best research circles, have disregarded the assistance which modern statistics can give. Charts.

M65 ———— (August, 1940) 38:153-158

Statistical analysis of metallurgical problems. E. M. Schrock.

Statistical methods are deemed necessary because of the score or more of variable factors in the manufacturing process of steel. The uncertainty of control necessitates use of statistical program for determination of importance of variations to reduce scrap, increase yields, and improve quality. Discusses the operations of statistical division attached to the metallurgical department of a large steel producer; statement of the program of statistical investigations and general classification of reports and procedures. Charts.

M66 ———— (June, 1942) 41:854

Contribution of statistics to the science of engineering. Walter A. Shewhart.

Abstract of a paper by the same name presented before the University of Pennsylvania Bicentennial Conference, September, 1940. Deals with the importance of probability and application of randomization in the comparison of new designs, new materials, or new alloys; study of contact phenomena under different conditions, corrosion of materials under different atmospheric conditions, and field trials of equipment to make sure that observed differences are not due to some assignable cause in the original operation. Basic hypotheses for statistical control are discussed and three hypotheses stated. Explains how basic experimental data for attaining control are obtained and interpreted. See also: Bell Telephone System Technical Publications, B-1319; also *U. of P. Bicentennial Conference on Fluid Mechanics and Statistical Methods in Engineering* (1941) pp. 97-124.

M67 ———— (March, 1943) 43:426

Quality control of munitions. G. D. Edwards.

Abstract of article "Quality Control of Munitions; the Modern Ounce of Prevention applied to Ordnance" by the author in *Army Ordnance* (November-December, 1942) 23:482-485; *Mechanical Engineering* (September, 1942) 64:673-675; abstract in *Metals and Alloys* (January, 1943) 17:206; article in *Engineering Inspection, Institution of, Journal* (Summer, 1943) 8:29-33.

M68 ———— (February, 1944) 45:282-283

Consumer control of quality by inspection: separating important from unimportant inspection operations. A. W. F. Green.

Lists material controls developed by and for the use of airplane engine manufacturers; points out ways in which control is exercised and what plant inspection control includes. Gives illustrations from the aircraft industry.

M69 ———— (February, 1944) 45:284-286

Consumer control of quality by inspection: the personal equation in inspection. John W. Sullivan.

Difficulty of applying statistical methods to the inspection act may lie in the attitude of inspection supervisor brought about through lack of understanding of the purposes of the new methods. Illustration of example with cards to explain the problem of evaluating the quality of a small lot with a small sample.

M70 ———— (February, 1944) 45:286-287

Consumer control of quality by inspection: acceptance control; not how much inspection but how good. L. E. Ekholm.

Explains that the fundamental purpose of inspection should be to record results and assist in analyzing them in order to raise the general quality level of the objects being produced, not simply to throw out bad material after production has been completed. Illustrations.

M71 ———— (February, 1944) 45:288-289

Consumer control of quality by inspection: precision measurements. J. A. Harrington.

Explains the National Bureau of Standards test for stability of gage blocks used for inspection of extremely fine tolerances.

M72 ———— (February, 1944) 45:290-292

Consumer control of quality by inspection: control charts. C. S. Gotwals.

The value of this modern device has proved its worth. Quality must be built into the product; no amount of inspection nor any function of quality control will in itself improve the quality. Quality control stripped of its technical terms is a very simple and understandable tool. The personnel must be sold on the method.

M73 ———— (February, 1944) 45:292-294

Consumer control of quality by inspection: specific application of quality control; acceptance inspection of ammunition. H. R. Bellinson.

Inspection as conceived by the Ordnance Department is built into the manufacturing process. Purpose of statistical acceptance inspection is that of determining whether the final product does meet the specifications and is acceptable. Article explains how the plan works.

M74 ———— (July, 1944) 46:116

Inspection in a manufacturing plant. D. B. Keeling and L. E. Cisne.

Abstract from article in *Bell System Technical Journal* (June, 1942) 21: 37-50. Briefly points out the steps in determining the applicability of the "Average Outgoing Quality Limit" Double Sampling plan. Analysis of the process; establishment of the A. O. Q. L. value; provision for inspection; and control chart.

M75 ———— (May, 1945) 47:941-946

The effect of tolerances on measurements. Sir Charles Darwin.

An interesting popular discourse on the meaning of tolerance with examples ranging from tolerances for whole number to tolerances of objects so small that a powerful microscope is needed to see them—and then to anything of completely unlimited size.

M76 METALS AND ALLOYS (January, 1943) 17:206

Quality control of munitions. G. D. Edwards.

Abstract of article on this subject in Army Ordnance (November-December, 1942) 23:482-485. Discusses why statistical quality control is needed in the manufacture of armament; need of special quality-control plan for each type of product and each set of production conditions. First step is the determination of the "process-average-quality" or quality of material actually being turned out under normal conditions of satisfactory operation; next step is to fix the "acceptable quality level." Description of inspection practice in use. See also *Metal Progress* (March, 1943) 43:426; *Mechanical Engineering* (September, 1942) 64:673-675; *Engineering Inspection, Institution of, Journal* (Summer, 1943) 8:29-33.

M77 ———— (January, 1944) 19:206

Quality control for aircraft.

Abstract of article "An Inspection Revolution by Bristol's" in *Aeroplane* (July 2, 1943) 65:12-13. Reference to method used by Bristol Aeroplane Co., England; the operation of a quality-control system has reduced the amount of scrapped parts from three per cent to .75 per cent and corrections from seven per cent to less than three per cent.

M78 ———— (January, 1945) 21:138

Statistical quality control. J. V. Sturtevant.

A brief statement concerning the increase in the practical use of statistical control. Enumerates in a clear manner effect of simplification of techniques, pressure of war needs for increased production and lowered inspection losses, and successful application in numerous industries. Lists six specific developments in the field during the past four years.

M79 ———— (June, 1945) 21:1736

Review of article "Maintaining Scientific Tolerances by Inspection" by William B. Rice in *Mechanical Engineerng* (March, 1945) 67:168-170.

M80 METALS TECHNOLOGY (August, 1938) 5:1-30

Utility of statistical methods in steel plants. H. J. Hand.

Discussion of the isolation of factors important as a cause of variability in a given process; determining whether observed differences between conditions are: (1) due to chance and not likely to be repetitive upon collection of additional data, (2) due to an actual difference between observed differences. Three methods for determining a direct or indirect effect of one variable affecting a process upon another. Discusses frequency curves, significance tests, control charts, and correlation methods. Lists five types of data not capable of statistical analysis. Tables and charts. See American Institute of Mining and Metallurgical Engineers, Technical Publication No. 940.

M81 MILL AND FACTORY (December, 1945) 37:111-113

Curbing defective work. A. L. Atherton.

Not available for review.

M82 MINING MAGAZINE (July, 1944) 34:335-337

Quality control inspection. J. Colasanti.

Abstract in *Science Abstracts Bulletin* (February, 1945) 48:26. Abstract in *Engineering Index* (1944) p. 840. Mathematical discussion of statistical method for controlling quality in mass production; while general in application acknowledgement is given for aid from Inspection Section, Production Service Branch, St. Louis Ordnance District.

M83 MONETARY TIMES (May, 1945) 113:29-31

Quality control.

Nontechnical popular description of statistical quality control illustrated with charts. Explains briefly several types of applications of quality-control charts and statistical sampling methods.

N1 NATURE (January 20, 1940) 145:117

Statistics and engineering practice. B. P. Dudding and W. J. Jennett.

Short article giving a brief abstract of a paper on "Statistics and Engineering Practice" before the Institution of Electrical Engineers in which emphasis was laid on the essentially statistical part that chance plays in many technical decisions, and to demonstrate the need for a technique which will give assistance in making deductions from test data. See *Electrical Engineers, Institution of, Journal* (July, 1940) 87:1-21.

N2 ———— (April 11, 1942) 149:408

Abstract of article "Quality Control in Manufacture" by H. Rissik in *Electrician* (March 27, 1942) 128:276-280. Gives credit to R. A. Fisher for theoretical foundation of the method of statistical quality control and Bell Telephone Laboratories of the United States credit for origination of the technique. States advantages of the method and what it means. See criticism by B. P. Dudding in this journal (May 16, 1942) 149:555. See *Beama Journal* (June, 1942) 49:163-167.

N3 ———— (May 16, 1942) 149:555

Quality control in manufacture. B. P. Dudding.

Very short article criticizing editor for giving R. A. Fisher credit for the foundation of quality control. Shewhart's visit to England in 1932 stimulated interest and led to British Standards Institution bulletin B.S. 600-1935, which has been followed by B.S. 600R-1942 and B.S. 1008-1942. Article criticized in this journal (April 11, 1942) 149:408.

N4 ———— (May 23, 1942) 149:573-575

Statistical control of production. C. G. Darwin.

Criticism of tolerances; the idea should be inculcated into people's minds that every number has a fringe, that a dimension or quantity is not to be regarded as exact but as so much plus or minus a bit, and that the size of this bit is one of its really important characteristics. Use of methods in U.S. arsenals and the meaning of this method of control. Diagrams. From

a paper presented at the joint meeting of Institutions of Civil, Electrical, and Mechanical Engineers, London, April 15, 1942. For full report of this meeting see *Mechanical Engineers, Institution of, Journal and Proceedings* (June, 1942) 147:125-144.

N5 ———— (April 14, 1945) 155:438-439

Modern statistical methods in industry. M. G. Kendall.

Book review of *Sampling Inspection Tables; Single and Double Sampling* by H. F. Dodge and H. G. Romig. See review in *American Statistical Association, Journal* (September, 1945) 40:382-384 by K. J. Arnold; also in *Mechanical Engineering* (April, 1945) 67:276-277 by E. L. Grant.

N6 ———— (August 18, 1945) 156:208

Economy in sampling. G. A. Barnard.

Letter to editor. Explains how to answer the question "How many items should I take for my sample?" by making sample size one of the variables which are determined in the course of the experiment itself and letting the answer come as soon as the results allow it.

P1 PAPER INDUSTRY AND PAPER WORLD (September, 1944) 26:717-720

Process control of quality by statistical method. J. B. Catlin.

Brings out the important need of statistical quality-control methods in the paper industry. A non-technical explanation of the reasons for and objectives of statistical quality control using a paper-mill situation and illustrating the various points with diagrams. Emphasizes the superiority of quality-control charts over the present type of testing logs used. Charts and bibliography.

P2 PAPER TRADE JOURNAL (March, 1938) 106:36-46

Quality control as applied to a paperboard mill. R. H. Rozitske.

An excellent article on control by methods other than the well-known statistical quality-control methods. Diagrams and tables.

P3 PRODUCT ENGINEERING (December, 1936) 7:465-468

Deviations in product prove machine performance. L. E. Simon.

Unreliable operation of automatic shell-loading machines discovered through sampling the output; assignable causes distinguished from chance errors. How quality-control charts of test data aid in discovering defective product. Charts.

P4 ———— (November, 1942) 13:634-636

Dimensional tolerances and quality control. J. W. White.

An engineer's view of the problems involved in the logical application of necessary dimensional tolerances in the manufacture of parts to permit a reasonable latitude for economical production, and at the same time meet the customer's specifications and control quality. Importance of following up the case history of tolerance observance as a guide to engineering in manufacturing. Illustrations, tables, and diagrams.

P5 ———— (February, 1943) 14:95-98

Wind tunnel test specifications for quality control of bomb fuses. A. L. Atherton.

Discusses the use of control chart for detecting trouble in the manufacture of bomb fuses; control-chart plotting distributions of samples of 25 from each day's production. Charts and illustration.

P6 ———— (October, 1943) 14:615-617

Statistical handling of laboratory data. E. U. Condon.

A practical article describing method of evaluating the significance of conclusions or inferences that might be drawn from data derived by testing a sample lot of items that have something in common but which also differ with regard to some of their attributes. Examples are given to illustrate procedures. Does not take up discussion of the quality-control chart. Discussion of Chi square test, standard error of percentages, and standard error of the differences between two percentages. Bibliography.

P7 PRODUCTION AND ENGINEERING BULLETIN (August, 1943) 2:3-8

Quality control charts.

Not available for review.

P8 ———— (January, 1944) 3:25-31

Quality control on hand-operated machines. Practical applications of quality control II.

Discusses the installation of control system where human element plays a major part in controlling the quality of the product; on which machines quality control may be used; the main sources of error; monthly check of rejects; modified control limits used. Figures.

P9 ———— (February, 1944) 3:49-54

Practical applications of quality control III. Group control charts.

Controlling the quality of a product made simultaneously on six similar but independent machine units; factors affecting control; checking the sample; calculation of control limits. Charts and illustration.

P10 ———— (April, 1944) 3:159-163

Quality control in operation IV. Quality control in an auto shop.

Describes with charts and pictures the application of statistical quality control in an automobile manufacturing plant. Training quality-control inspectors; deciding what to control; the government inspection check; "suspects" held; and inspection equipment used. Figures.

P11 ———— (May, 1944) 3:231-233

Frame gauge for quality control; speedy check of eight dimensions under quality control.

How one company overcame the difficulty of keeping several dimensions of one component under control simultaneously by use of comparators incorporating dial indicator gauges. Rapid results of measuring up to eight dimensions on a single component. Illustrated.

P12 ———— (October, 1944) 3:433-437

Quality control by limit gauging.

Quality control based upon inspection using limit gauges is useful where it has been found impracticable to apply methods of quality control by measurement. Two complete examples are given. Figures.

P13 ———— (October, 1944) 3:437-438

Quality control panel; Midland Region organizes exchange of information.

Results are reported of eight evening lectures at Birmingham Technical College; exhibit of inspection methods and equipment.

P14 ———— (December, 1944) 3:537-542

Small batch quality control.

Describes methods of an engineering firm producing components in batch quantities of from 200 to 1000. How the charts are used; organizing the quality-control system; three examples: (1) applications to typical components, (2) component previously controlled, (3) deals with situation when tolerance cannot be held. Discusses the cooperation required between departments. Figures.

P15 ———— (January, 1945) 4:38

Quality control travelling scholarships.

Refers to travelling scholarships of 350 pounds sterling each to enable recipients to spend three months in the United States studying the application of statistical methods. The money to be furnished by a large number of local firms and individuals under the auspices of the Quality Control Panel of Birmingham District Production Committee. See *Industrial Quality Control* (January, 1946) 2, 4a:10 for outline of one of the two winning papers—that of William A. Bennett—"Application of Information Made Available by Statistical Quality Control to the Process of Manufacture Statistical Quality Control Bureau as Means of Arriving at Data."

P16 ———— (April, 1945) 4:129-132

Quality control in die casting.

Novel use of quality control as a check against porosity during manufacture. Discusses the application of quality control in the production of zinc-base pressure die castings. See *Aircraft Production* (May, 1945) 7:216-218 for reprint of this article.

P17 ———— (May, 1945) 4:157-161

Coil winding under quality control.

Describes an actual case with illustrations of workers and quality-control charts used on machines. Shows how trouble was located. Charts were found to provide valuable data for designers, planning engineers, inspection and production personnel. Figures.

P18 ———— (July, 1945) 4:256-257

Nomogram for quality.

Quick method of estimating the quality of the work produced by a machine. The article and nomogram were prepared by the Ministry of Supply Advisory Service on Quality Control.

P19 ———— (August, 1945) 4:321-326

Sampling inspection schemes.

Sampling methods illustrated by a Southwestern firm's practice in the inspection of a magnesium alloy casting. The personal element involved; illustration of sampling from cards; a practical example; starting the sampling scheme; sampling inspection chart; results of the sampling scheme; the operation characteristic; size of sample. Figures and tables.

P20 ———— (September-October, 1945) 4:350-355

A double sampling inspection scheme.

Sampling methods applied by a Midlands firm effect economies in production of a small aluminum component. The sampling scheme; the scheme in use; defects recorded; lot tolerance; average outgoing quality limit; average amount of inspection. Charts and tables.

P21 PRODUCTION ENGINEERS, INSTITUTION OF, JOURNAL (January, 1942) 21:13-62

Sampling inspection and quality control. B. P. Dudding.

Methods of applying principles of statistical probabilities in production are stated to be of inestimable value for insuring the attainment of work of a prescribed standard.

P22 PURCHASING (July, 1941) 11:59-61

Laboratory control of incoming materials. J. R. Brossman.

Not available for review.

P23 ———— (February, 1943) 14:92-93

Raw material quality control. A. W. Pond.

Reviewed in *Engineering Index* (1943) page 846. A review of considerations of job of stating in the most desirable form what shall be the quality requirements of items of purchased raw materials for a manufacturing concern; discussion is confined to duties of purchasing and engineering personnel.

P24 ———— (March, 1943) 14:78-79

Controlling those "controlled materials." G. Kende.

Not available for review.

R1 RAYON TEXTILE MONTHLY (November, 1936) 17:749-750

Statistical methods as an aid to the control of quality of materials. D. Harvey.

A short article setting forth the need of statistical control of variation in textile production. Diagram and bibliography.

R2 ———— (June, 1940) 21:345-346

Some thoughts on the scientific approach to textile problems. A. C. Walker.

Very short article which presents elementary discussion of the use of a quality-control chart. Chart and diagram.

R3 ———— (November, 1943) 24:88

Statistical quality control in textiles needed.

Short article describing the preparation of Quartermaster Corps to employ statistical quality control in sampling and testing mill deliveries of textile supplies in order to arrive at a sharper differentiation between acceptable goods and deliveries which contain too high a percentage of defects. Rule-of-thumb methods are to give way to statistical quality control.

R4 ———— (August, 1945) 26:397-399

Quality control by statistical methods. A. E. Dennis.

Some of the elements making for goodness of product; the part top management plays in planning, managing, and directing the quality-control program; must know the quality produced or proposed; selection of proper men to man the program; must support the program; process specialist in charge; selection of quality-control man; departmentalizing quality control and need for such a department; outsider not necessary; meaning of economic control; phases and aspects of quality-control plan.

R5 ROCK PRODUCTS (August, 1940) 43:47-48

Sampling cement materials. N. C. Rockwood.

Argument for applying statistical quality control to production of Portland cement. Methods now in use for sampling cement. Charts and diagrams.

R6 ROYAL SOCIETY OF EDINBURGH, PROCEEDINGS (1937) 57:228-240

Tests for randomness in a series of numerical observations. W. O. Kermack and A. G. McKendrick.

Discussion of probability theory in connection with runs. Shows the probability of a run of any length "l" occurring in an observed set of "N" runs up and down from any infinite random sequence independent of the law of distribution of the variable.

R7 ———— (1937) 57:353-356

Tests for randomness in a series of numerical observations. W. O. Kermack and A. G. McKendrick.

Deals with runs theory and its use even though dealing with an observed distribution of runs from a finite sequence.

R8 ROYAL SOCIETY OF LONDON, PROCEEDINGS (June 18, 1945) 183:405-435

The statistical theory of the strength of bundles of threads. H. E. Daniels.

Not available for review.

R9 ROYAL STATISTICAL SOCIETY, JOURNAL (1933) 96, part 1:21-75

A survey of the uses of statistical method in the control and standardization of quality of manufactured products. E. S. Pearson.

One of the earliest rather full discussions of quality control by statistical methods published in England. Meaning of statistical control is discussed;

problems are presented with illustrations from business. Explanation of the use of control charts for arithmetic mean, standard deviation, coefficient of variation, and fraction defective, with details for guidance in setting of control limits. Charts, tables, and mathematical appendix.

R10 ———— (1934) supplement 1, no. 1:5-25

The application of statistical methods to production and research in industry. R. H. Pickard.

Discusses the place of statistical techniques and statisticians in industry. Deals with control of quality, research in industry, and problems of management and production.

R11 ———— (1934) supplement 1, no. 2:107-151

Sampling problems in industry. E. S. Pearson.

An excellent article classifying the problems of sampling as to method of sampling, type of material, and conditions and place of sampling. Drawing of random or representative samples is explained; drawing of representative samples from materials consisting of separate units or materials in bulk. Conditions affecting sampling done in motion and from consignments delivered to user. Charts and mathematical appendix.

R12 ———— (1934) supplement 1, no. 2:152-206

Discrimination by specification statistically considered and illustrated by the standard specification for Portland cement. B. H. Wilsdon.

The use of the quality-control chart is illustrated at page 174 in this technical discussion concerning the cement industry. Charts and tables.

R13 ———— (1935) supplement 2, no. 1:1-26

Statistical methods in industry with special reference to the sampling of coal and other materials. E. S. Grumell.

A technical article dealing with the use of statistical methods for solving industrial problems. Illustration of the use of the quality-control chart for the control of ash content of dry slack is given at page 12. Charts and tables.

R14 ———— (1935) supplement 2, no. 1:83-98

The use of range in place of standard deviation in small samples. E. S. Pearson and Joan Haines.

A rather full discussion of a technical character which is basic in probing the use to which the range can be put in statistical quality control. Deals with certain aspects of the relation between standard deviation and range that need to be taken into account in deciding in what circumstances the standard deviation may be safely replaced by the range. Comparisons are made of standard deviation and range under various circumstances of sampling. The use of the quality-control chart is shown at page 84. Charts and tables.

R15 ———— (1936) supplement 3, no. 1 :1-28

Application of statistical principles to an industrial problem. W. J. Jennett and B. P. Dudding.

Statistical approach to solution of a practical and complex problem in manufacture of incandescent lamps is demonstrated and discussed by use of correlation, analysis of variance, and quality-control-chart techniques. Use of control chart shown at page 22. Charts, tables, and diagrams.

R16 ———— (1936) supplement 3, no. 1 :29-48

Specification of rules for rejecting too variable a product with particular reference to an electric lamp. B. L. Welch.

Based on data collected on the market and tested to furnish certain information about the total product represented. Experiment was based on data from the electrical-lamp field. Comparison of different methods of sampling. Handling of data used to guide those interested in controlling the quality of electric lamps when drawing up clauses specifying when sampling should be made in the market and tested to furnish certain required information about the total product which these samples represent. Charts and tables.

R17 ———— (1937) supplement 4, no. 1 :61-101

Some considerations of the variability of cotton cloth strength. A. W. Bayes.

Illustrations of the use of quality-control charts are presented in this technical article dealing with sampling and the application of statistical analysis in the textile industry. Use of quality-control chart presented at page 70. Charts and tables.

R18 ———— (1939) supplement 6 :25-50

Statistical control of the quality of telephone service. W. F. Newland and E. E. Neal.

Describes methods of sampling and analyzing data for control of telephone service quality as used by the British Post Office. Charts and tables. See also *Engineering* (British) (February 3, 1939) 147 :136 for abstract; and *Electric Communications* (October, 1940) 19 :127-138.

R19 ———— (1939) supplement 6, no. 2 :149-168

The application of elementary statistical methods to problems encountered in the operation of electricity generating stations. J. L. Ineson.

The use of control charts is demonstrated in a technical article dealing with forecasting heat consumption and fuel cost of generating stations. In this instance the chart is used to plot regression constants in order to determine if they cease to be valid. See particularly pages 159-160. Charts.

R20 ———— (1940-1941) supplement 7, no. 1 :86-87

Book review of *Statistical Method from the Viewpoint of Quality Control* by Walter A. Shewhart. Reviews in other journals cited under book title.

R21 ———— (1943) 106, no. 1:64-67

Industrial applications group of the Royal Statistical Society: first session 1942-1943. B. P. Dudding.

Report on first four meetings with reviews of the subjects discussed. (1) The relation between design tolerances and control-chart limits in manufacture; (2) the study of qualitative data—material classified as defectives; (3) group control charts; (4) other applications of the quality-control-chart technique.

R22 RUBBER AGE (August, 1945) 57:551-558

Application of statistical methods to the production of synthetic rubber. G. R. Vila and M. D. Gross.

Describes clearly how the Synthetic Rubber Division, United States Rubber Company, Nangatuck, Conn., uses statistical quality-control methods. The use of frequency-distribution curves in sampling and control of production for presentation of accumulated, historical data. Control charts are used to give day-to-day sequence. Variation analysis is used to determine the significance of difference between averages in samples. Correlation is valuable for analyzing large masses of data and has a variety of applications in this industry. Charts and tables.

S1 SANKHYA (The Indian Journal of Statistics) (June, 1943) 6: 329-330

Note on the sampling error in the method of double sampling. C. Bose.

Not available for review.

S2 SCIENCE (March 7, 1941) 93, supplement: 10

Mathematical statistics speeds mass production. Walter A. Shewhart.

Short abstract of a paper on "Mathematical Statistics in Mass Production" before a symposium on allied mathematics held by the American Mathematical Society, New York, February 21, 1941. Concerns speeding of mass production by showing the most efficient way of producing parts of a specified tolerance and determination of the most efficient design. Author states that statistical theory plus mass production provides a means of maximizing our physical comforts in time of peace and our strategic factors in time of war.

S3 ———— (November 27, 1942) 96:494-495

Tools of science and the war industry; Stanford University course in statistical methods of quality control and improved methods of sampling. H. Working.

Short article telling how the original courses in statistical quality control were originated at Stanford University.

S4 ———— (March 5, 1943) 97:209-214

Opportunities in mathematical statistics with special reference to sampling and quality control. W. Edwards Deming.

Explanation of variation in nature, and definition of a chance cause system. Meaning of randomness, statistical control, and technical control. The

fundamental problem of mathematical statistics is to set tolerances. Of what the Shewhart method consists. Opportunities of mathematical statisticians in industry and details of a seven-point program for bringing about their greater usefulness in industry. See also *American Society of Naval Engineers, Journal* (August, 1943) 55:573-579, for abstract.

S5 ———— (March 19, 1943) 97:269-270

An application of the control chart method to the analysis of fisheries data. W. H. Rich.

Short abstract of *The Salmon Runs of the Columbia River in 1938* by the author for Department of Research, Fish Commission of Oregon—contribution No. 7. Points out how information obtained through the use of modern control-chart technique might have been used as a basis for action and helped maintain an otherwise decreasing production after 1930. Bibliography.

S6 SCIENCE AND APPLIANCE (April, 1944) 8:1-2

Quality control.

Not available for review.

S7 SHEET METAL INDUSTRIES (June, 1942) 16:794-797

Discussion on application of statistical control to quality of materials and manufactured products. Not available for review.

S8 SOCIETY FOR THE ADVANCEMENT OF MANAGEMENT, JOURNAL (September, 1937) 2:140-142

The use of factory inspection statistics. C. M. Armstrong.

A popular presentation in nontechnical language of the problem of uniformity in production and how to set about obtaining control over assignable variations in quality.

S9 SOCIETY OF AUTOMOTIVE ENGINEERS, JOURNAL (July, 1943) 51:65-66

Compares inspection methods of Wars I and II. Abstract of papers and discussions at Detroit War Material Meeting. "Progress in Precision; Inspection Methods through the Automotive Age to World War II" by O. J. Snider. Capt. F. A. Gitzendanner of the Ordnance Department discussed statistical quality control as used by that department citing advantages of the method. Mr. Maxon of Deere and Co. gave his idea of advantages of the method stating that statistical quality control is not inspection but a method of determining how well inspection is done.

S10 ———— (December, 1943) 51:421-431

Progress in precision; inspection methods used in manufacturing airplane engine crankshafts. O. J. Snider.

Brief descriptions of various types and methods of inspection now in use Illustrated with 36 photographs.

S11 ———— (August, 1944) 52:337-347

Quality control of engineering materials during manufacturing and processing. R. H. McCarroll and J. L. McCloud.

A nontechnical presentation amply illustrated. Shows how the Ford Motor Company operates its quality-control system for materials, process specifications, and finished parts. Does not deal with the techniques of statistical quality control. Charts and illustrations.

S12 ———— (August, 1944) 52:380-384

Getting a better grip on quality control. J. Gaillard.

A practical article popularizing statistical quality-control methods. Gives advantages in use of quality-control charts; how the theory of probability can help the practical quality-control man do a better job. Charts.

S13 SOCIETY OF CHEMICAL INDUSTRY, JOURNAL (March 3, 1933) 52:185

Application of statistical methods to the quality control of manufactured products. B. P. Dudding and I. M. Baker.

Abstract of paper presented before the Society of Glass Technology. See *Society of Glass Technology, Journal* (September, 1933) 17:239-259; and abstract in *Engineering* (British) (March 9, 1934) 137:288.

S14 SOCIETY OF DYERS AND COLORISTS, JOURNAL (August, 1943) 59:161-164

Postwar industry and quality control. B. H. Wilsdon.

Not available for review.

S15 SOCIETY OF GLASS TECHNOLOGY, JOURNAL (1932) 16:360-374

Statistical methods for routine testing of bottles. F. C. Flint and A. K. Lyle.

Explains the use of arithmetic mean, standard deviation, and number in sample for derivation of effective average, standard deviation of the mean, and standard deviation of the difference between two means. Gives results of experimental testing of strength of bottles; impact, internal pressure, and thermal shock tests.

S16 ———— (September, 1933) 17:239-259

The application of statistical methods to the control of manufactured products. B. P. Dudding and I. M. Baker.

Determination of limits to be used on quality-control charts; adaptability of charts to scrutiny of routine test data; methods of testing significance of two estimates of correlation coefficient. See this journal (March, 1934) 18:19-31. See abstracts in *Engineering* (British) (March 9, 1934) 137:288; and *Society of Chemical Industry, Journal* (March 3, 1933) 52:185.

S17 ———— (March, 1934) 18:19-31

The application of statistical methods to the planning of routine testing procedure. B. P. Dudding and I. M. Baker.

Questions raised during discussion of former paper (September, 1933) 17:239-259 are covered. Factors which should be considered in deciding on

population, recording of test data, number of items in test sample, and determination of rejection limits. Tables and diagrams.

S18 SOUTHERN ECONOMIC JOURNAL (October, 1945) 12:115-129

The use of statistical methods for economic control of quality in industry. Dudley J. Cowden and W. S. Connor.

Not available for review.

S19 STEEL (April 26, 1937) 100:77

Organizing for effective product inspection. B. S. Taylor.

Reasons are given for the necessity of continuous scrutiny of specifications, number of samples tested, and types of test, in order to avoid waste and excessive testing.

S20 ———— (December 1, 1941) 109:76

Graphic records for quality control in welding. H. Lawrence.

An interesting article describing the use of an Arconograph, an instrument for preparing a type of mechanical quality-control chart. This instrument records the ratio between the formative period during which the globules of weld metal take shape on the end of the electrode and the deposition period during which actual metal transfer occurs. Illustrated.

S21 ———— (January 19, 1942) 110:58-61

Quality control in bomb fuse manufacture. A. L. Atherton.

A short but excellent illustration of the application of quality control to mass production. Shows the avoidance of 100 per cent inspection wherever possible. Advantages cited of the use of these statistical techniques. Based on installation of system at Westinghouse Electric and Manufacturing Company plant, East Springfield. Illustrated.

S22 ———— (April 27, 1942) 110:95-96

Quality control assures consistent welding of diversified materials. F. C. Gandert.

Explanation of quality-control system at Westinghouse Electric and Manufacturing Company plant, Mansfield, Ohio, giving description of checks on four factors involved: strength, appearance, production, and machine settings. Does not discuss statistical quality control. Illustrated.

S23 ———— (October 26, 1942) 111:92-94

Quality control in the manufacture of permanent magnets cuts rejects 90 percent. J. H. Goss.

Example of application of statistical quality control to an actual manufacturing process at General Electric Company plant, Schenectady. Losses due to low magnet strength were reduced from ten per cent to one per cent by application of these methods. Describes the manufacturing process. Use of quality control charts is outlined and demonstrated by means of ten charts. Charts and illustrations.

S24 ———— (May 17, 1943) 112:128

Standard sampling methods; checking the chemical analysis of steel shipments.

Illustration showing drill locations for sampling various sections of steel. Table of standard variations over and under specified range or limit for various types of metal. Founded on American Iron and Steel Institute rules.

S25 ———— (January 24, 1944) 114:68

Quality control in production welding. W. J. Brooking.

Article principally on the inspection of welding operations; statistical quality-control methods and charts are given incidental mention at end of article.

S26 ———— (January 24, 1944) 114:75

Statistical control gains adherents by its record.

Editorial stating that the use of statistics has introduced a new mode of thinking. Besides the quality-control field, mathematical statistics have found wartime applications in personnel administration and in industrial, operational, and market research.

S27 ———— (February 26, 1945) 116:82-83

Quality control of enameling steels. R. F. Bisbee.

This article is not on statistical quality control but is significant for the unusual control methods used by Westinghouse Electric and Manufacturing Company's quality-control department for testing materials purchased, grading suppliers of steels quarterly to reduce trouble in processing and speeding up production. The grading classifications are determined through evaluating actual performance of the materials, through receiving department tests, and laboratory reports. Illustrated.

S28 ———— (May 28, 1945) 116:105

A new gaging method for quality control. P. M. Dickerson.

Explains a method used by Westinghouse Electric and Manufacturing Company for detecting trends and distributions in defective production, used in conjunction with "go" and "not go" gauges. Control charts by attributes show progress in relation to tolerances on an hourly basis. Cites savings on rework effected by methods used as over 90 per cent. Charts.

S29 ———— (June 11, 1945) 116:123

Controlling quality of products by statistical methods. Joseph Manuele.

States the purposes of quality control; explains that the mean is within the skill of the operator to control while the standard deviation is a measure of the process to repeat consistently. Steps in setting up statistical analysis of operations and how "first piece and patrol" inspection is established whereby statistical method is avoided. Methods established by Westinghouse Electric Corporation are used as an example.

S30 ———— (July 30, 1945) 117:88

What the executive should know about quality control. Eugene Caldwell.

A good summary which is designed to sell the idea of quality control to management. Classifies the efforts toward quality control as: purchasing, design, manufacturing, inspection, and finished product. As subheadings under finished product: performance, appearance, assembly, and interchangeability of parts. Each of the above items is explained. Illustrates the cardinal engineering principal of efficiency in designing a product and also the importance of clear specifications.

S31 STEEL PROCESSING (March, 1945) 31:168-172

Quality control in a forge shop. J. Mueller.

Not on statistical quality control but showing by means of report forms the methods used to control quality in Cleveland Hardware and Forging Company plant from raw materials to finished products. Figures.

T1 TAYLOR SOCIETY BULLETIN (April, 1941) Bulletin 16:81-82

An outline of organization for quality control. A. G. Ashcroft.

Outlines the duties of general administrative, inspection, and product-development divisions for quality control and gives results obtained.

T2 TEXTILE INSTITUTE JOURNAL (January, 1935) 26:13-50

Statistical methods in textile research; uses of the binomial and Poisson distributions. L. H. C. Tippett.

Mathematical article of importance to statistical investigators in the textile industries and to others confronted with problems involving counts for determining the proportion of observations having particular character and counts for determining the mean rate of occurrence of random events. Bibliography.

T3 ———— (February, 1935) 26:151-170

Statistical methods in textile research; part 3 — a snap-reading method of making time-studies of machines and operatives in factory surveys. L. H. C. Tippett.

How knowledge of relative rates of output may be obtained on which to take action for reorganization of the work of operatives for the purpose of correctly proportioning overhead costs in a situation involving manufacture of several kinds of cloth. Classification of errors inherent in the application of the snap-reading method to surveys in cotton mills. Examination of data based on machine and operative observations. Fifteen tables used.

T4 TEXTILE MANUFACTURER (December, 1943) 69:520-521

Quality control in postwar trade. B. H. Wilsdon.

Not available for review.

T5 TEXTILE RESEARCH INSTITUTE JOURNAL (October, 1944) 14:319-325

The quality control chart technique in applied textile research. O. P. Beckwith.

Not available for review.

T6 ———— (June, 1945) 15:201-222
Textile yarn abrasion test. P. S. Olmstead and A. C. Walker.
Not available for review.

T7 TEXTILE WORLD (December, 1943) 93:69-71
Quality control charts aid textile manufacturers in meeting strict requirements of Army and Navy. A. G. Ashcroft.
An introductory article describing the need for and origination of statistical quality control. Several textile mill quality-control charts are reproduced and explained. Description of the educational program under way in this field. Charts.

T8 ———— (January, 1944) 94:79-81
A fresh approach to quality control. O. P. Beckwith.
Six advantages of the control-chart method for control of quality are explained. Illustrations of use of quality-control charts in textile production are presented together with explanation of the movements and actions to be taken. Charts.

T9 ———— (May, 1944) 94:88-89
Sampling plan developed by Quartermaster for woolen textiles.
Application of statistical methods to inspection procedure is illustrated. Deals with inspection system applied to textile materials; acceptance limit will run about ten per cent defective. Statistical methods are used to analyze data obtained from inspection at Philadelphia Depot.

T10 ———— (July, 1944) 94:63
Quality control posts mill-production odds. F. M. Steadman.
Abstract of an address on opening a course in statistical quality control at Georgia School of Technology, June 21, 1944. Charts indicate when corrective action is required; limits vary in different mills; explains that Quartermaster uses control methods for inspection.

T11 TIMES, THE LONDON (April 16, 1942) page 2
Speeding production.
Editorial makes reference to the April 15 meeting of the Institutions of Civil, Electrical, and Mechanical Engineers. States briefly what quality control is and quotes from the speech of Sir Francis Gill.

T12 TOOL AND DIE JOURNAL (March, 1945) 10:132-134
A new gaging method for quality control. P. M. Dickerson.
Not available for review.

T13 TOOL ENGINEER (October, 1940) 9:24
Quality control. C. E. Fomnitz.
Not available for review.

T14 ———— (July, 1945) no citation available.
Research and quality control of materials. E. H. Gurney.
Not available for review.

W1 WELDING JOURNAL (January, 1944) 23:48-59

Quality control in aircraft spotwelding. N. C. Clark.

A rather thorough discussion of basic requirements of practical quality control and how to realize them. The use of statistical methods for regulation is stressed and procedure is outlined for installing a statistical control system. Seven nondestructive test methods are enumerated as well as eight examples of methods of measuring the energy used in making the weld. Benefits to be derived from complete quality control are listed and an appendix of statistical measures of spot-weld quality are explained in detail. Charts.

W2 ———— (May, 1945) 24:455-461

Determination by statistical analysis of process minimums for spot welding. Harold Robinson.

Describes a statistical procedure designed to account for the inherent variability in the spot-welding process in establishing process minimums. A minimum and measurable risk against the process falling below specification quality is provided. Discusses requirements to use procedure. Nomogram for determining process minimums for spot welding. Figures.

W3 ———— (October, 1945) 24:909-914

Some conclusions regarding resistance welding and statistical quality control. John B. Butler.

Discussion of sampling in destructive testing; necessity for obtainance of a uniform universe and an unbiased sample. Article does not attempt to outline possible systems of quality control because of variation of problem from plant to plant; shows how the presence of predominant variables may be ascertained and presents worked-out examples with frequency distributions. Data are of spot welds taken from Air Corps Technical Report No. 4554.

W4 WESTERN FLYING (May, 1943) 23:48-49

Quality control at Ryan. K. Monroe.

A popularized version of a system for correcting deviations from standards used at Ryan Aeronautical Company, San Diego, Calif.

W5 WESTERN INDUSTRY (December, 1943; January, 1944) 8:32; 9:36

Quality control through statistics. William B. Rice.

Explanation in story form of the needs for and advantages of quality control through statistics. Uses practical examples of specification problems and shows the solutions of the problems. Charts.

W6 WESTERN METALS (August, 1944) 2:56-58

Statistical quality control—a new tool of production. Grant I. Butterbaugh.

Briefly explains the meaning of statistical quality control and states some of the advantages of this technique, the use of which has received impetus due to our war requirements. Bibliography.

W7 WINGS (September, 1944) 3:1181-1186

Bell puts teeth into quality control. H. Chase.

Describes quality-control system of Bell Aircraft Corporation; use of statistical quality-control charts. Presents forms used.

W8 ———— (November, 1944) 3:1276-1278

Planned inspection improves quality control. H. Chase.

How General Electric Company plant at Fort Edwards, N.Y., uses planned inspection; first-piece check, required before machine operators can proceed, is helpful. Some special fixtures facilitate measurements; selective assembly aids in holding certain close limits. See review in *Aeronautical Engineering Review* (December, 1944) 3:83.

W9 ———— (December, 1944) 3:1313-1318

Records keep everybody quality conscious. H. A. Bartholomaei.

Describes reports, forms, and charts illustrating how Bendix Radio plant operates its statistical quality-control system to keep personnel efficient and at the same time increase their wages. Cites savings from the program. See review in *Aeronautical Engineering Review* (February, 1945) 4:98-99.

W10 ———— (August, 1945) 4:1665-1667

Quality must be built—all along the line. L. R. Barrett.

Not available for review.

W11 ———— (September, 1945) 4:1716-1719

Costs dropped, quality bettered, through statistical controls. Eugene L. Grant.

Not available for review.

W12 WIRE AND WIRE PRODUCTS (March, 1943) 18:169

Minimizing rejects. T. W. Fazakerley.

Reviewed in *Engineering Index* (1943) page 846. Describes methods used by British concern in reducing defective work in manufacture and in eliminating rejects; price fixing disposal of defective goods.

W13 WIRELESS WORLD (August, 1945) 51:243-245

What is quality control. Background for wireless technicians. T. Roddam.

Explains in simple nontechnical language the idea behind and objectives of quality control. Explains quality control as a method of squeezing the maximum amount of information out of test results with a minimum of delay. Figures.

W14 WORLD POWER (July, 1936) 26:16-17

Statistical method as an aid to control of industrial efficiency. E. S. Pearson.

In manufacture or purchase on a large scale it is desirable to check the extent of variations among articles by some routine testing system. Analysis of variation is explained. Article is an abridgement of a paper presented at the Chemical Engineering Congress of the World Power Conference, London, June, 1936.

Part II

a1 AIRCRAFT WAR PRODUCTION COUNCIL, INC.
Statistical Control of Quality for the Aviation Industry (1944), D. D. Pettitt and E. E. Bates.
Not available for review.

a2 ALEXANDER SMITH AND SONS CARPET COMPANY, Yonkers, N. Y.
Statistical Methods of Quality Control in Textile Manufacturing (December, 1943-January, 1944), A. G. Ashcroft and O. P. Beckwith. Pp. 14.
Not available for review.

a3 AMERICAN MANAGEMENT ASSOCIATION
Quality and Inventory Control (1938).
Not available for review.

a4 AMERICAN SOCIETY FOR TESTING MATERIALS, Philadelphia, Pa.
Manual on Presentation of Data (1933). Pp. 38.
The first edition of this well-known handbook did not include the two supplements included in the 1937 edition.

a5 —
1933 A. S. T. M. Manual on Presentation of Data (March, 1937). Pp. 73.
The second printing of this manual included Supplement A—presenting plus and minus limits of uncertainty of an observed average; Supplement B—"control chart" method of analysis and presentation of data; and tables of squares and square roots. The Supplements A and B had been issued separately in 1935.

a6 —
Manual on Presentation of Data (August, 1940; March, 1941).
This popular handbook had its third printing in 1940 and its fourth printing in 1941.

a7 —
Manual on Presentation of Data (1945). Pp. 73.
The latest printing of the manual which has been in use by engineers and quality-control statisticians for the past twelve years. See review in *American Statistical Association, Journal* (September, 1945) 40:377-378 by Eugene L. Grant.

a8 AMERICAN STANDARDS ASSOCIATION, New York, N. Y.
Guide for Quality Control and Control Chart Method of Analyzing Data (May, 1941). Pp. 66.

A manual combining the American War Standards Z1.1-1941 and Z1.2-1941 which has become a handbook for all who are interested in the subject of statistical quality control. See reviews: *Industrial Standardization* (June, 1941) 12:137-141, by John Gaillard; *American Statistical Association, Journal* (September, 1945) 40:379-380, by Frederick Mosteller.

a9
Control Chart Method of Controlling Quality During Production (April, 1942). Pp. 41.

A manual on the use of control charts known as Z1.3-1942 which has become a handbook for all who are interested in the subject of quality control by statistical methods. See reviews: *Industrial Standardization* (May, 1942) 13:109-110, by John Gaillard; *American Statistical Association, Journal* (September, 1945) 40:379-380, by Frederick Mosteller.

a10 BELL SYSTEM TECHNICAL PUBLICATIONS (December, 1928) B-362. Pp. 7.
Significance of an Observed Range. Walter A. Shewhart.

New experimental results giving for the first time means of estimating the expected probability associated with an observed range of variation in a set of experimental data. Reprint of an article in *Journal of Forestry* (November, 1928) 26:899-905.

a11 ———— (January, 1929) B-366. Pp. 16.
Using Inspection Data to Control Quality. H. F. Dodge.

See notes under *Manufacturing Industries* (November, December, 1928) 16:517-519, 613-615. This monograph is a reprint of the two articles cited.

a12 ———— B-431.
A Method of Sampling Inspection. H. F. Dodge and H. G. Romig.

See note under *Bell System Technical Journal* (October, 1929) 8:613-631. This monograph is a reprint of the article cited.

a13 ———— (June, 1930) B-496. Pp. 26.
Economic Quality Control of Manufactured Product. Walter A. Shewhart.

See note under *Bell System Technical Journal* (April, 1930) 9:364-389. This monograph is a reprint of the article cited.

a14 ———— B-1089. Pp. 24.
Application of Statistical Methods to Manufacturing Problems. Walter A. Shewhart.

See note under *Franklin Institute, Journal* (August, 1938) 226:163-186. This monograph is a reprint of the article cited.

a15 ———— B-1261.

Note on Theoretical and Observed Distribution of Repetitive Occurrences. P. S. Olmstead.

See note under *Annals of Mathematical Statistics* (September, 1940) 11:363-366, an abstract of the monograph.

a16 ———— (January, 1941) B-1274.

Single Sampling and Double Sampling Inspection Tables. H. F. Dodge and H. G. Romig.

See note under *Bell System Technical Journal* (January, 1941) 20:1-61; same article. See review in *Nature* (April 14, 1945) 155:438-439. See *Mechanical Engineering* (April, 1945) 67:276-277 for review by Eugene L. Grant. See review in *Engineering* (January 26, 1945) 159:63.

a17 ———— (1941) B-1319. Pp. 28.

Contribution of Statistics to the Science of Engineering. Walter A. Shewhart.

Describes how statistics enters engineering problems through the theory of probability; basic contribution of classical statistical theory; its basic statistical hypothesis; basic statistical experiment or operation of drawing at random; and its basic test of statistical hypotheses. Also, four uses of basic contributions of classical statistical theory. The basic contributions of statistical control theory are presented with three basic hypotheses of statistical control theory and basic experimental data for attaining control. Summary of potential contributions of statistics to the science of engineering. See abstract in *Metal Progress* (June, 1942) 41:854. See *University of Pennsylvania Bicentennial Conference on Fluid Mechanics and Statistical Methods in Engineering* (1941) pages 97-124.

a18 ———— B-1345.

Inspection in a Manufacturing Plant. D. B. Keeling and L. E. Cisne.

See note under *Bell System Technical Journal* (June, 1942) 21:37-50 for same material.

a19 ———— (1942) B-1350. Pp. 14.

Use of Statistical Control in Corrosion and Contact Resistance. W. E. Campbell.

Statistical criteria are described which can be used to aid in detecting and eliminating causes of lack of statistical control, and it is demonstrated how an experimental error in the contact resistance-measuring apparatus was eliminated using these criteria.

a20 BRISTOL AEROPLANE CO., LTD.

Quality Control Handbook (1944).

Not available for review. This handbook is considered by *Engineering* to be a first-rate practical description of quality-control charts as applied to machine-shop production on short orders.

a21 BRITISH MINISTRY OF PRODUCTION; BIRMINGHAM DISTRICT PRODUCTION COMMITTEE; QUALITY CONTROL PANEL.

Statistical Quality Control (March, 1945). Pp. 76.

Not available for review. Symposium of papers on statistical quality control. Introduction, Quality Control in Industry, W. A. Bennett. Pp. 2-4.

1. Direct Measurement, E. H. Sealy. Pp. 5-8.
2. Number Defectives, D. J. Desmond. Pp. 9-21.
3. Application and Organization of Statistical Quality Control in a Light Engineering Plant, D. S. McNaughton. Pp. 22-37.
4. Part 1. Practical Application of Statistical Quality Control in the Press Shop, W. N. Baker. Pp. 38-39.
4. Part 2. The Practical Application and Organization of Statistical Quality Control in Deep Drawing Press Shop, H. C. Webb. Pp. 40-44.
5. Sampling Schemes for Number Defectives Inspection, for Quality Estimation of Single Lots, A. W. Swan. Pp. 45-66.
6. Associated Statistical Techniques, J. W. Rodgers. Pp. 67-74.

See reviews in *American Statistical Association, Journal* (March, 1946) 41:121-123 by Irving W. Burr; 41:123-125 by Paul Peach.

a22 BRITISH MINISTRY OF SUPPLY, London.

A First Guide to Quality Control for Engineers (1943), E. H. Sealy. Pp. 38.

Not available for review. A small book designed to guide the engineer in getting a system of statistical quality control started in a plant. Emphasis is placed on "modified control limits." Illustrative examples are given and discussed. See review in *American Statistical Association, Journal* (September, 1945) 40:403-404 by W. Edwards Deming.

a23 BRITISH MINISTRY OF SUPPLY. DIRECTORATE OF ROYAL ORDNANCE FACTORIES (Explosives).

Industrial Experimentation (June, 1945). Pp. 87.

Not available for review. See reviews in *American Statistical Association, Journal* (March, 1946) 41:125-127 by John W. Tukey; 41:127-128 by J. Wolfowitz.

a24 BRITISH STANDARDS INSTITUTION, London.

The Application of Statistical Methods to Industrial Standardization and Quality Control (1935), by E. S. Pearson. Pp. 161.

This manual B.S. 600 is the first publication of the Institution on the subject of statistical quality-control methods. A practical and popularizing exposition. It states the assistance to be found in proper and adequate statistical techniques for the solution of many industrial problems. For reviews see: *Mechanical Engineering* (May, 1936) 58:326-328 by L. K. Sillcox; same journal (April, 1937) 59:261-262 by H. A. Freeman; *Industrial Standardization* (February, 1936) 7:37-40 by J. Gaillard. Not available for review.

a25 ———

Quality Control Charts (1942), B. P. Dudding and W. J. Jennett. Pp. 85.

This manual B.S. 600R-1942 is a revision of B.S. 600-1935. Discusses the utility of statistical methods; control of manufacturing procedures; preparation of quality-control charts with examples from factory practice. See reviews in *Mechanical World* (October 23, 1942) 112:383-384; *American Statistical Association, Journal* (September, 1945) 40:386 by H. A. Freeman. Not available for review.

a26 ———

Quality Control: being a copy of American Defence Emergency Standards Z1.1-1941 and Z1.2-1941 and Appendices Thereto. Pp. 49.

See American Standards Association manuals. This manual is B.S. 1008-1942.

a27 COLUMBIA UNIVERSITY, New York, N. Y.

Allowable Average in Sampling Inspection (March, 1939), H. G. Romig.

Doctoral thesis. Analysis of a continuous variable. Statistical theory of runs is of usefulness to industrial statisticians. Tests may be desired for lack of randomness in a series. Development of sampling plan for variables. Not available for review.

a28 ———

Sequential Analysis of Statistical Data; Applications (1945). Statistical Research Group, Columbia University. Pp. 300.

A manual on the application of the sequential probability ratio test to certain specific problems. See reviews in *American Statistical Association, Journal* (March, 1946) 41:137-138 by Henry Scheffé; and pp. 138-140 by B. L. Welch.

a29 COMMONWEALTH OF AUSTRALIA MINISTRY OF MUNITIONS, Melbourne.

Quality Control Lectures (1944).

Not available for review.

a30 DEFENCE INDUSTRIES, LTD., Montreal, Canada.

The Application of Quality Control by Statistical Methods at Verdun Works.

Not available for review.

a31 DoALL COMPANY (Gage Division), Minneapolis, Minn.

Quality Control with DoALL Gages and Gage Instruments (1945). Pp. 140.

See Part III, Quality Control, pp. 57-64. Explains the use of statistical methods of product sampling in quality control; the purpose of the sampling method of inspection with seven advantages; effective application of the sampling method. Five illustrations of charts. Effective statistical tolerance limits; suggestions for setting up the quality-control program; practical effects of the statistical method; instructive warning given in limitations of the sampling method. Charts.

a32 FEDERAL PRODUCTS CORPORATION, Providence, R. I.

Dimensional Quality Control Primer (1946). Pp. 37.

A simplified method for applying statistical quality control to dimensions. Explains advantages of quality control and what is meant by dimensional quality control. Gives first steps in applying the system; how to use work sheets; how to construct and plot the quality control shop analysis chart; interpretation and use of the charts; use of quality control information in a practical application; suggestions for carrying dimensional quality control into a department and applying it throughout the shop. Charts, diagrams, tables, and illustrations.

a33 GENERAL ELECTRIC COMPANY, Fort Wayne Works.

Product Rejection Data (July 8, 1944), K. E. Ross.

Mimeograph. Not available for review.

a34 GENERAL ELECTRIC COMPANY, Pittsfield, Mass.

Quality Control for Thermosetting Plastic Materials and Products. H. M. Richardson and J. J. Pyle.

Not available for review.

a35 HUNTER PRESSED STEEL COMPANY, Lansdale, Pa.

Statistical Methods in Quality Control (1944). P. C. Clarke and G. R. Armstrong. Pp. 101.

This is a practical handbook for use by engineers and inspection personnel profuse with illustrations, charts, diagrams, data sheets, and tables showing examples and uses of statistical techniques in analysis of frequency distributions and quality-control charts. See review in *American Statistical Association, Journal* (March, 1946) 41:130-132 by G. R. Gause.

a36 IRON AND STEEL INDUSTRIAL RESEARCH COUNCIL, BRITISH IRON AND STEEL FEDERATION.

Statistical Methods in Industry (January, 1943). L. H. C. Tippett. Pp. 74.

An introductory lecture on "Probability Theory and Statistical Method" by E. S. Pearson, and a series of six lectures by L. H. C. Tippett, together with a discussion which followed the last lecture. Subject matter covers frequency distributions, errors of random sampling, control charts and quality control, analysis of variation, correlation (simple, partial, and multiple), sampling in practice, and design of experiments. Not available for review.

a37 LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION, London.

Standardization and Quality Control (January 25, 1935). S. F. Dunkley. Pp. 46.

Not available for review.

a38 LUKAS-HAROLD CORPORATION.

A Shop Manual of Quality Control (1944). Pp. 11.

Not available for review.

a39 MANCHESTER STATISTICAL SOCIETY, Manchester, England.

Applications of Statistical Methods to the Control of Quality in Industrial Production (1936). L. H. C. Tippett. Pp. 32.

Not available for review.

a40 MASSACHUSETTS INSTITUTE OF TECHNOLOGY. INDUSTRIAL STATISTICS CONFERENCE PROCEEDINGS, Pittman Publishing Co., New York, N. Y. (1939).

Types of Statistical Methods used and Problems handled in Industrial Quality Control. H. A. Freeman. Pp. 2-25.

Examples are given illustrating quality-control problems in various industrial fields and how statistical methods are used to solve them. Bibliography.

a41 ———

Some Statistical Techniques Underlying the Field of Quality Control. G. P. Wadsworth. Pp. 26-46.

A technical article introductory to ideas and terminology to be used by other speakers at the conference.

a42

Application of Statistical Method in Mass Production. Walter A. Shewhart. Pp. 47-108. Discussion by H. F. Dodge, pp. 108-127.

A lengthy, interesting article stating and discussing the propositions that: (1) statistical method plus mass production equals a new tool of research; (2) with this new tool of research it is possible to make the most efficient use of raw and fabricated materials and to attain the highest possible quality assurance; (3) the use of statistical method in mass production provides a scientific method for minimizing the cost of producing things to satisfy human wants. Deals with the use of control charts. Charts and tables.

a43

A Method of Expressing Quality. Leslie E. Simon. Pp. 128-136.

A relatively short article offering a system for summarizing quality (1) by grading as to functioning and nonfunctioning quality, or (2) a less precise method of expression by merely grading according to the lower of the two kinds of quality.

a44

Why the Kendall Company is interested in Statistical Methods. W. Eustis. Pp. 137-145.

A relatively short article affirming the benefits to be derived from the use of statistical methods in the operation of textile mills.

a45

The Statistical Principles of Experimentation, with Particular Reference to Experimentation in Textile Factories. L. H. C. Tippett. Pp. 174-209.

Discussion of the necessity of exercising as much control over the factors in an experiment as possible under existing circumstances. Aims of the statistician in experimentation. Explains the meaning of reduction of errors by averaging, the "null" hypothesis, determination of hypotheses, level of significance, effect of uncontrolled factors, and conditions of randomness. Examples of tests of significance by analysis of variance.

a46 **Statistical Aspects of the Control of Quality in Textile Manufacture. L. H. C. Tippett. Pp. 210-270. Discussion by H. R. Bellinson, pp. 271-282.**

A statistical discussion of the routine control of count in a cotton-spinning mill. Some statistical quantities and their practical significance; some investigations of the sources of variation in factories; applications of the analysis of variance.

a47 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, Mass.

Application of Statistical Methods to the Control of Quality of Manufactured Gas (1937). E. R. Pettebone and L. C. Young.

Thesis. Not available for review.

a48 ———

An Application of Statistical Methods to Quality Control in a Radio Tube Plant (1939). N. Shoumatoff.

Thesis. Not available for review.

a49 OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT, WAR PRODUCTION BOARD, Washington, D. C.

Manual for an Introduction to Statistical Methods of Quality Control in Industry; an Outline of a Course of Lectures and Exercises (April, 1944). Holbrook Working and E. G. Olds. Pp. 68.

Mimeographed. Manual used in 8-day intensive courses for industrial personnel and educators.

a50 OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT, WAR PRODUCTION BOARD, QUALITY CONTROL PROGRAM, CARNEGIE INSTITUTE OF TECHNOLOGY, Pittsburgh, Pa.

Introduction of Statistical Quality Control at Illinois Testing Laboratories (May, 1945). James A. Fizzell. Pp. 9.

Quality Control Reports, No. 1. Describes examples of the use of statistical methods in a small concern employing less than 250 persons which are helping to speed up production and prevent waste. Realistic problems faced on initiation of the system; steps taken in starting the system; results of record-keeping; accomplishments in the use of statistical quality control. Charts. See reviews in *American Statistical Association, Journal* (March, 1946) 41:115-118 by G. W. Brown; 41:118-121 by Louis C. Young.

a51 ————

Organizations Concerned with Statistical Quality Control (June, 1945). Holbrook Working and Edwin G. Olds. Pp. 42.

Quality Control Reports, No. 2. Lists alphabetically over 850 organizations which sent representatives to attend 34 short intensive courses in statistical quality control between July, 1942, and May, 1945. Also lists organizations geographically. Tabulation of educational institutions, lecturers, and instructors cooperating in the program. See reviews noted under Report No. 1 above.

a52 ————

Statistical Quality Control at the St. Louis Division of American Stove Company (August, 1945). Lester A. Kauffman. Pp. 22.

Quality Control Reports, No. 3. Describes how a plant employing 1200 people, 150 of whom were in the inspection department, introduced statistical quality control in the manufacture of fragmentation bombs, bomb casings, and jettison fuel tanks. Practical examples are given in which quality control operations are explained. Charts and tables. See reviews noted under Report No. 1 above.

a53 ————

Quality Control at the Lukas-Harold Corporation (August, 1945). Carl G. Schmid. Pp. 10.

Quality Control Reports, No. 4. Explains how a company producing the Norden bombsight, which is characterized by the extremely high precision of its component parts, introduced and used statistical quality-control methods. An interesting component bar chart shows what quality control has accomplished in this plant; cites savings from April, 1944, to June, 1945, wherein the rejection rate in the machine-tool division as a whole fell 75 per cent. Heavy emphasis laid on chart for averages for reduction of scrap in machining operations. Charts. See reviews noted under Report No. 1 above.

a54

Statistical Quality Control in Radio Manufacture (September, 1945). Fred Trowbridge and John T. Clark. Pp. 12.

Quality Control Reports, No. 5. This paper is based on the experiences of the Sentinel Radio Company with statistical quality control. This company employed 700 people of whom 125 were in the quality-control department. Describes the problem of correlation of very delicate testing equipment. A specific problem in connection with the production and assembly of a telescoping whip antenna is described in some detail and how the control chart was used in solution of the problem. Cites savings made in inspection costs. Figures. See reviews noted under Report No. 1 above.

a55 ————

An Application of Statistical Quality Control at the Hoover Ball and Bearing Company (September, 1945). Russell C. Trombly. Pp. 9.

Quality Control Reports, No. 6. How this manufacturing company introduced statistical quality control; enumeration of direct and indirect results attained and benefits derived from the methods. Figures. See reviews noted under Report No. 1 above.

a56 ———

An Adaptation of Statistical Quality Control at Aldens' (September, 1945). James M. Ballowe. Pp. 12.

Quality Control Reports, No. 7. Describes the use of statistical quality-control system by a mail-order company where human operations are substituted for machine operations. Operations of a mail-order company; initial control chart described; how a quality-control program was extended to various departments; sampling procedure, goals accomplished, good customer-relationship maintenance. Figures and tables. See reviews noted under Report No. 1 above.

a57

An Application of Statistical Quality Control at the John Deere Tractor Company (September, 1945). E. L. Fay. Pp. 9.

Quality Control Reports, No. 8. Outlines the experiences of the company in the introduction of statistical quality-control methods. First steps; application of control charts at piston pin operations; application to an automatic screw machine; basic causes for defective pieces; further expansion of quality control; in-plant training in quality control; organizational status of the quality-control unit; and future plans. Figures. See reviews noted under Report No. 1 above.

a58 ———

Statistical Quality Control at Lockheed (September, 1945). James R. Crawford and Preston C. Hammer. Pp. 17.

Quality Control Reports, No. 9. Reviews certain experiences at Lockheed Aircraft Corporation in introducing statistical quality-control methods. Initiation developments; in-plant training; organization and functions; quality of purchased matériel; quality-control stamps; fabrication and assembly control; spot-welding control; special statistical studies; inspection performance; final quality check; educational program; executives' quality audit. Figures and table. See reviews noted under Report No. 1 above.

a59

Some Aspects of Quality Control in the Steel Industry (September, 1945). Richard H. Ede and Earl W. Mahaney. Pp. 12.

Quality Control Reports, No. 10. Describes the application of statistical methods at the Gary works of the Carnegie-Illinois Steel Corporation. Description of processes; introduction of modern statistical quality-control methods; use of correlation technique; quality-control testing of semi-finished steel bars; the problem, method of attack, and how statistical methods were introduced. See reviews noted under Report No. 1 above.

a60

Bibliography on Statistical Quality Control (September, 1945). Dorothy W. Goodfellow. Pp. 48.

Quality Control Reports, No. 11. Lists of references: periodicals in chronological order, technical and industrial publications, and books. Covers a broader field than statistical quality control. See reviews noted under Report No. 1 above.

a61 ————

Some Experiments Illustrating Principles of Quality Control (September, 1945). Irving W. Burr. Pp. 12.

Quality Control Reports, No. 12. Descriptive article on laws of probability which aims to give one the "feel" of these laws of chance. Distribution of dice totals; use of control chart; experiments on kinds of sampling; experiments on fraction defective; acceptance sampling by control chart; and assignable causes with dice. See reviews noted under Report No. 1 above.

a62 OHIO CONFERENCE OF STATISTICIANS ON BUSINESS RESEARCH—PROCEEDINGS.

On Some Contributions of Statistical Inference to Marketing Research (1941). W. Edwards Deming. Pp. 13-22; discussion, pp. 23-24.

Need for directing the collection of data for marketing research towards the identification of causes of increases or decreases in sales. Benefits to be derived through application of Shewhart methods of quality control; features of the plan. The part sampling plays in marketing research. Outline of the main aspects of the statistician's job. Recognition of two principal types of statistical problems and the relationship between the evidence, degree of belief in the prediction based on the evidence, the action to be taken, and the possible consequences of the action.

a63 PHILIPS LAMPS, LTD., London, England.

Statistics and Quality Control (1943). A. S. Wharton.

Not available for review. See note under *Quality through Statistics,* A. S. Wharton, b17.

a64 PICATINNY ARSENAL, Dover, N. J.

Quality Control through Sampling Inspection. A. C. Cohen, Jr.

Not available for review.

a65 PROCTOR AND GAMBLE MANUFACTURING COMPANY, Long Beach, Calif.

Outline of a Course in Statistical Methods for Chemists and Engineers. P. Thomsen.

Not available for review.

a66 SENTINEL RADIO CORPORATION, QUALITY CONTROL DEPARTMENT, Evanston, Ill.

A Manual of Statistical Methods of Quality Control (1945).

Not available for review.

a67 STANFORD UNIVERSITY, CALIF.

A Guide to Utilization of the Binomial and Poisson Distributions in Industrial Quality Control (1943). Holbrook Working. Pp. 13.

Consists of four parts covering: (1) binomial distribution; (2) devices for facilitating the use of the binomial distribution; (3) the Poisson distribution, an aid to its utilization; and (4) approximations in the application of statistical theory. See review in *American Statistical Association, Journal* (September, 1945) 40:413-415 by H. G. Romig.

a68 UNITED STATES DEPARTMENT OF AGRICULTURE, Washington, D. C.

Statistical Method from the Viewpoint of Quality Control (1939). Walter A. Shewhart. Edited by W. Edwards Deming for The Graduate School. Pp. 155.

See reviews: *Industrial Standardization* (May, 1940) 11:109-118 by John Gaillard; *Mechanical Engineering* (June, 1940) 62:475-476 by L. C. Young; *Franklin Institute, Journal* (July, 1940) 229:816-817 by R. H. Oppermann; *Royal Statistical Society, Journal* (1940-1941) Sup. 7, No. 1: 86-87.

a69 UNITED STATES RUBBER COMPANY

Notes on Quality Control. The Control Chart Method of Inspection (April, 1944) R. J. Hartmann. Pp. 15.

Not available for review.

a70

Methods in Quality Control (1944). L. W. Montreuil and Paul Peach.

Not available for review.

a71 UNIVERSITY OF PENNSYLVANIA BICENTENNIAL CONFERENCE ON FLUID MECHANICS AND STATISTICAL METHODS IN ENGINEERING (1941)

Relation of Statistical Quality Standards to Law and Legislation. R. Pound. Pp. 146.

Not available for review.

a72

Contribution of Statistics to the Science of Engineering. Walter A. Shewhart. Pp. 97-124.

See also Bell System Technical Publications (1941) B-1319. Pp. 28. Also, *Metal Progress* (June, 1942) 41:854, for abstract.

a73

Contribution of Statistics in the Development and Use of Purchasing Specifications and Standards of Quality. Leslie E. Simon.

Not available for review.

a74

Contribution of Mathematical Statistics to Scientific Methodology. S. S. Wilks.

Not available for review.

a75 VEGA AIRCRAFT CORPORATION, Los Angeles, Calif.

Quality Control; the Laws of Chance Applied to Inspection Problems (1944). James R. Crawford. Pp. 117.

Ditto processed. A summary of a series of lectures given by Stanford University at the University Club of Los Angeles, September 20-27, 1942. Second edition for use in an E.S.M.W.T. course in Quality Control under the auspices of the University of California at Los Angeles.

a76 WAR PRODUCTION BOARD, Polymer Research Branch

Quality Control Charts as applied to GR-S Production (May 30, 1944). C. S. Fuller.

Not available for review.

a77 WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, East Pittsburgh, Pa.

Statistical Tools for Controlling Quality. Joseph Manuele and Casper Goffman. Pp. 31.

Explains the basic elements of the frequency distribution for use in seeing what the quality of the product is likely to be; the control chart for helping to detect variations in statistical control so that corrective measures may be taken to avoid producing defective product; and the analysis of variance to check for significant differences between parts produced by different tools. Examples are worked out to illustrate use of these statistical techniques. Charts, tables, figures.

Part III

b1 CROXTON, F. E. and COWDEN, DUDLEY J.
Applied General Statistics, Prentice-Hall, Inc., New York, N. Y., 1943.
Reference to statistical quality-control methods on pages 348-351.

b2 DODGE, H. F. and ROMIG, H. G.
Sampling Inspection Tables; Single and Double Sampling, John Wiley and Sons, Inc., New York, N. Y., 1944. Pp. 106.
This book is a reprint of two papers by H. F. Dodge and H. G. Romig and one by Miss D. B. Keeling and L. E. Cisne which appeared in the *Bell System Technical Journal* as follows: (October, 1929) 8:613-631; (January, 1941) 20:1-61; and (June, 1942) 21:37-50. The tables were a part of the second paper. The three papers have also appeared as Bell System Technical Publications B-431, B-1274, and B-1345. See review in *American Statistical Association, Journal* (September, 1945) 40:382-384 by K. J. Arnold; also *Mechanical Engineering* (April, 1945) 67:276-277 by Eugene L. Grant; *Nature* (April 14, 1945) 155:438-439.

b3 DUDDING, B. P. and JENNETT, W. J.
Quality Control Chart Techniques When Manufacturing to a Specification: With Special Reference to Articles Machined to Dimensional Tolerances, General Electric Company, Ltd., London, 1944; Gryphon Press, Arlington, Va., 1945. Pp. 74.
Covers the material found in manuals of American Society for Testing Materials and American Standards Association. See review in *American Statistical Association, Journal* (September, 1945) 40:386 by H. A. Freeman.

b4 FREEMAN, HAROLD A.
Industrial Statistics; Statistical Technique Applied to Problems in Industrial Research and Quality Control, John Wiley and Sons, New York, N. Y., 1942. Pp. 178.
See review in *Mechanical Engineering* (August, 1942) 64:613-614 by G. P. Wadsworth.

b5 ———
Type of Statistical Methods Used and Problems Handled in Industrial Quality Control, Pitman Publishing Company, New York, N. Y., 1939.
Not available for review.

b6 FRY, T. C.

Probability and its Engineering Uses, D. Van Nostrand Co., Inc., New York, N. Y., 1928. Pp. 471.

See pages 315-317 relative to control charts. How probability is measured; permutations and combinations; elementary principles of the theory of probability with instructive illustrations; probability and experiment; Bernoulli's theorem; probability and experiment; Bayes' theorem; distribution functions and continuous variables; averages; the distribution functions most frequently used in engineering; curve fitting; the theory of probability as applied to problems pertinent to the telephone business; fluctuation phenomena in physics; tables of numerous types in appendices.

b7 JURAN, J. M.

Management of Inspection and Quality Control, Harper and Bros., New York, N. Y., 1945. Pp. 233.

A manual for engineers, plant managers, plant supervisors, and inspection personnel which sets forth the techniques and procedures, as well as the basic principles, of quality control. See reviews: *Mechanical Engineering* (June, 1945) 67:417; *Industrial Quality Control* (July, 1945) 2, No. 1: 18-19 by M. A. Brumbaugh; *American Statistical Association, Journal* (September, 1945) 40:395-396 by A. I. Peterson.

b8 KOEPKE, CHARLES A.

Plant Production Control, John Wiley and Sons, New York, N. Y., 1941; Chapman and Hall, Ltd., London, England, 1941.

See Chapter 23 on Inspection, pages 458-490, particularly pages 484-488 where brief reference is made to statistical quality control and the modern viewpoint of the inspection problem.

b9 MITCHELL, WILLIAM N.

Organization and Management of Production, McGraw-Hill, New York, N. Y., 1939.

Not available for review.

b10 NEWMAN, WILLIAM H.

Business Policies and Management, Southwestern Publishing Co., 1940.

Not available for review.

b11 PEACH, PAUL

An Introduction to Industrial Statistics and Quality Control, L. B. Phillips Company, Raleigh, N. C., 1945. Pp. 150.

Out of print. Revised edition, Edwards and Broughton, Raleigh, N. C., 1946. Not available for review. See review in *American Statistical Association, Journal* (March, 1946) 41:133-135 by J. H. Curtiss.

b12 PEARSON, E. S.

The Application of Statistical Methods to Industrial Standardization, American Standards Association Library, New York, N. Y. Pp. 161.

Not available for review.

b13

Production Handbook, Ronald Press, New York, N. Y., 1944.

See Section 10. Quality Control. Pp. 675-725. A. I. Peterson. This is an excellent reference in adequate detail with examples and illustrations. Covers design-control approach to manufacturing; organization for quality control; statistical presentation and control methods; works inspection record and breakdown; process control with measurements on variables; process control with parallel units; setup and patrol inspection for control; acceptance sampling inspection plans. Filled with valuable suggestions, information, forms, and tables. 29 figures.

b14 SHEWHART, WALTER A.

Economic Control of Quality of Manufactured Product, D. Van Nostrand Co., New York, N. Y., 1931. Pp. 501.

This book can be said to be the cornerstone in the foundational literature on the subject of statistical control. It deals with (1) fundamental concepts of statistical control and an outline of five economic advantages obtainable through statistical control of quality of manufactured product; (2) a review of the methods for reducing large numbers of observations of quality to a few simple functions of these data which contain the essential information; (3) a statement of the necessary and sufficient conditions for the specification of a controlled quality; (4) a discussion of the sampling fluctuations in the simple statistics used in the control of quality; (5) the establishment of economic tolerances and standards of quality involving the use of three simple statistics; (6) five criteria for determining when variations in quality should not be left to chance; (7) fundamental principles underlying the theory of control and an outline of the method of attaining control of quality from raw material to finished product.

b15 SIMON, LESLIE E.

An Engineers' Manual of Statistical Methods, John Wiley and Sons, New York, N. Y., 1941. Pp. 231.

A popular manual on quality control by statistical methods based on experience and observation in the manufacture of ordnance material. See review in *Engineer* (August 28, 1942) 174:173.

b16 TIPPETT, L. H. C.

Statistical Methods in Industry, Iron and Steel Industrial Research Council, British Iron and Steel Federation, London, England, 1943. Pp. 74.

See review in *American Statistical Association, Journal* (September, 1945) 40:408-409 by P. S. Olmstead.

b17 WHARTON, A. S.

Quality through Statistics, Philips Lamps Ltd., London, 1945; Gryphon Press, Arlington, Va., 1945. Pp. 60.

An account of statistical methods used in the maintenance of quality in the Philips Lamps Ltd. Covers control of quality under headings (1) batch-by-batch receiving inspection of raw and processed materials; (2) control inspection in process; (3) analysis of cumulative results of inspections to establish standards of performance and efficiency. A nonmathematical treatise. See review in *American Statistical Association, Journal* (September, 1945) 40:411-413.

Index of Authors

A BIBLIOGRAPHY

of

STATISTICAL QUALITY CONTROL

By

GRANT I. BUTTERBAUGH

PUBLISHED FOR THE BUREAU OF BUSINESS RESEARCH
OF THE COLLEGE OF ECONOMICS AND BUSINESS
BY THE UNIVERSITY OF WASHINGTON PRESS
Seattle • 1946